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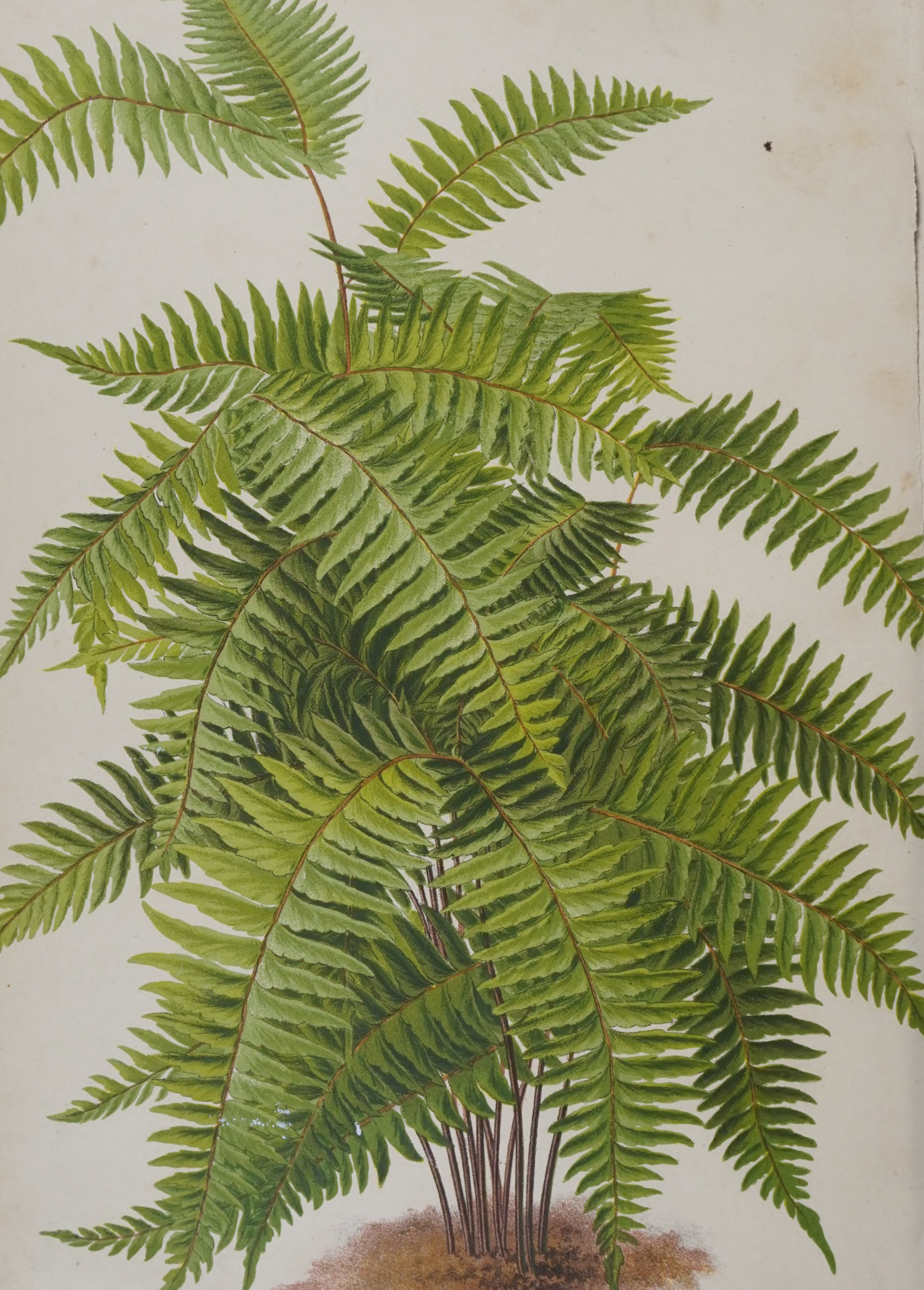

THE BOOK
OF
CHOICE FERNS
FOR
THE GARDEN, CONSERVATORY, AND STOVE.

DESCRIBING AND GIVING EXPLICIT CULTURAL DIRECTIONS FOR THE BEST
AND MOST STRIKING FERNS AND SELAGINELLAS IN CULTIVATION.

ILLUSTRATED WITH
COLOURED PLATES AND NUMEROUS WOOD ENGRAVINGS,
SPECIALLY PREPARED FOR THIS WORK.

ACC No 5765

BY

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VOLUME I.
FROM INTRODUCTION TO ATHYRIUM.

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PREFACE.

THE BOOK OF CHOICE FERNS, published by the same Firm as Nicholson's "Dictionary of Gardening," is, like that most useful of publications relating to all gardening matters, intended to be the most complete of all popular works written on the subject to which it is specially devoted. In its compilation, the Author besides giving the public the benefit of a knowledge acquired by over twenty years of observation and experience as a practical cultivator has on his part neglected no opportunity of consulting the accepted botanical authorities on the subject; and, so far as the nomenclature is concerned, has almost invariably adhered to the line adopted by Hooker and Baker in their "Synopsis Filicum," a work which is, and for a long time to come no doubt will be, considered as the standard authority on matters relating exclusively to Ferns.

The Author would here briefly refer to the plan he has adopted in the description of the genera and species, of giving in plain English the meanings of the botanical terms used. "The Book of Choice Ferns" is intended as a book of reference, especially for those who have not an every-day acquaintance with scientific terms, and to whom a string of such terms would be tedious or even unmeaning except to the industrious few who would go through the labour of translating them by the aid of a glossary. But by the plan here followed a double purpose is served, for whilst accuracy is not sacrificed to the unscientific reader the meaning is made abundantly clear, and he is at the same time, gradually and without special effort, made to acquire a proper knowledge of the use of words which he will find of constant service.

The word "leafit" has been used throughout the work as explanatory of the botanical term "pinnule," which means a sub-division of a compound leaf. The word has been adopted as being the one appealing most directly to the mind of the reader little versed in botanical terms, and also as the one affording less ambiguity; for it has been thought that the words "pinna or leaflet" and "pinnule or leaflet of a leaflet, or sub-division of a leaflet," might, when used in the description of the same plant, prove embarrassing to the reader. The latter, when once acquainted with the word "leafit"—which we find has been used by George W. Johnson, F.R.H.S., throughout his excellent *popular* book on "British Ferns," published as far back as 1851—cannot possibly misunderstand its application.

Through his liberality in producing exceedingly well-executed drawings from nature, the Publisher, already well known to all concerned in horticultural pursuits, has greatly added to the intrinsic value of the work, and it is to be hoped that his earnest efforts will be as duly appreciated by the public—for whom the book is intended—as they are by the Author, who fully acknowledges these as a material and valuable help to his own endeavours to produce accurate and reliable descriptions of all Ferns contained in it. In many instances one or other of the marvellous photo-processes has been called into requisition, as they give a result so far superior to and so much more true to nature than any ordinary wood-engraving. In support of this the Author would refer to the illustrations of the Nash Court and other ferneries, and to the figures of *Acrostichum scandens*, *Asplenium rutæfolium*, &c., than which it is hardly possible to imagine anything more satisfactory.

The Author's grateful thanks are due to Colonel Beddome for permission to reproduce many of the illustrations in his large works, "The Ferns of British India" and "The Ferns of Southern India," to the Authorities at Kew Gardens for permitting drawings to be made there of herbarium as well as of living specimens; and to Messrs. J. Veitch and Sons for allowing views of their Ferneries and Ferns in their extensive collection to be sketched for the illustration of his work, as also for lending—like Messrs. Birkenhead, of Sale, and W. Bull, of Chelsea—faithful drawings from their catalogues, which, in combination with those made especially by the Publisher, give the work a degree of attraction which it would not otherwise have possessed.

The Author also desires to express the obligation he is under to Mr. W. Robinson, of "The Garden," for permitting him to make use of some matter previously published by him in "The Garden." To the late Rev. Percy W. Myles the Author and the reader are greatly indebted for having added the proper pronunciation of names which do not occur in his nearly exhaustive and wholly invaluable Dictionary of Pronunciation in the Supplement of the "Dictionary of Gardening."

GEORGE SCHNEIDER.

LONDON, 1892.

CONTENTS.

Chapter	Page
I.—INTRODUCTION	1
II.—CLASSIFICATION FOR DECORATIVE PURPOSES	8
III.—TREE FERNS	12
IV.—GIGANTIC NON-ARBORESCENT FERNS	19
V.—SMALL-GROWING FERNS	23
VI.—FERNS WITH COLOURED OR TINTED FRONDS	29
VII.—VARIEGATED AND CRESTED FERNS	36
VIII.—GOLD AND SILVER FERNS	49
IX.—CLIMBING, TRAILING, AND DROOPING FERNS	57
X.—FILMY OR TRANSPARENT FERNS	73
XI.—VIVIPAROUS AND PROLIFEROUS FERNS	82
XII.—CURIOUS FERNS	96
XIII.—DRYING FERN FRONDS	103
XIV.—FERTILISATION AND PROPAGATION	108
XV.—CULTURAL DIRECTIONS	144
XVI.—VARIOUS FANCY WAYS OF GROWING FERNS	161
XVII.—FERN FOES, BRITISH AND EXOTIC	169
XVIII.—ACROSTICHUM, *Linnæus*	179
XIX.—ACTINIOPTERIS, *Link*	236
XX.—ADIANTUM, *Linnæus*	240
XXI.—ALLANTODIA, *Wallich*	337
XXII.—ALSOPHILA, *Brown*	339
XXIII.—ANEMIA, *Swartz*	380
XXIV.—ANGIOPTERIS, *Hoffmann*	397
XXV.—ANTROPHYUM, *Kaulfuss*	402
XXVI.—ASPIDIUM, *Swartz*	410
XXVII.—ASPLENIUM, *Linnæus* [including ATHYRIUM]	479

THE

BOOK OF CHOICE FERNS.

CHAPTER I.

INTRODUCTION.

THE sole object of the Author, as also of the Publisher, in bringing out this new book on Ferns, is to render these most interesting plants attractive, by presenting to the public their classification in as simple a form as possible, and by giving detailed instructions which will ensure their successful cultivation. The necessity of producing such a work as the present one has forced itself upon the attention of its Author, not only from the love which he personally entertains for Ferns, but also from the tendency to partial neglect which he—as well as all those concerned in the preservation of beautiful and useful plants—has lately noticed with a deep sense of regret. For it is incontestable that fashion, which is as tyrannical in the court of flowers as in any other, has of recent years brought about great changes in the cultivation of certain classes of plants; and Ferns have not escaped the effects of the submission to the general sentiment and usage, to the current of which they have had to yield to such a degree as to seriously endanger the preservation of even collections which have been formed at no ordinary amount of expense and devotion. That of our great national Botanic Gardens at Kew is, happily, a striking exception to the rule. It is, however, notorious, and it must therefore be frankly acknowledged, though with regret, that in all that is of human contrivance change is not invariably an improvement, and many beautiful Ferns which formerly were grown for their intrinsic value are greatly in danger of passing into oblivion. This would be nothing short of a calamity, as, in the majority of cases, these are plants whose introduction into this country represents years of labour and a vast amount of anxiety, dependent as it has been on the exertions of collectors sent out by private firms and great public institutions for the purpose of discovering plants whose real value may be said to reside in their relations to one another. This change of fashion has resulted in a new departure in cultivation — one which consists in producing almost exclusively plants intended to yield a supply of flowers and foliage for the decoration of the dinner table, and which has entirely revolutionised the art of gardening. It is well known that in many private places, where what may be termed "collection-plants" were largely grown, and special pleasure was derived from such a culture, quantities of plants exclusively devoted to indoor decoration may now be seen in their stead. As regards Ferns, it may reasonably be assumed that, although thousands of them are now grown where dozens only were to be found a few years ago, many really good, and often most beautiful, sorts are becoming scarcer every successive season. The reason assigned for this state of things is that kinds adapted to the purpose of decorating are comparatively few in number, and the demand for such being yearly on the increase, it is only natural that nurserymen should devote more space to these kinds, to the exclusion of many others which, however beautiful in themselves, are unsuitable for indoor decoration.

Although the character of this work is not intended to be purely botanical, the utmost attention will be paid to the rules laid down by the best acknowledged authorities, as has already been the case in Nicholson's "Dictionary of Gardening."* It has, therefore, been found advisable to follow the classification adopted by Hooker and Baker in their "Synopsis Filicum," this being undoubtedly the safest guide. The adoption of their nomenclature may, to some readers, appear at first sight somewhat paradoxical as it is proposed that the present work should be conducted on a popular basis, whereas the excellent book referred to is a purely botanical work. The great aim of the Author, however, is the simplification of the gardening nomenclature, which at present is still very complicated ; and although names which have long been in use in botanical books of standard position, but which have never been generally adopted, may for a time appear strange to the practical Fern-grower and amateur, it is confidently hoped that their adoption in this popular work will prove of some service in spreading, in a simple and comprehensive form, a general knowledge of the proper classification, and therefore of the true names, of the Ferns described. It will be noticed that, whenever any popularly-known genus has been transferred into another, a special reference to it will be made. The use of obsolete names will be completely abandoned ; and, so far as practicable, the synonyms by which some species have long been popularly known, will at the same time and place be given, in conjunction with the new names, which will retain priority over them.

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* "The Dictionary of Gardening." Edited by Geo. Nicholson, A.L.S., Curator of the Royal Gardens, Kew. London: L. Upcott Gill, 170, Strand, W.C.

The work will deal with the great Fern Family in its entirety, retaining all that is essential in the original botanical descriptions, but purposely avoiding technical terms whenever expressions sufficiently significant, but of a more popular nature, and therefore more readily understood by the great mass of readers for whom this publication is intended, can be used. On account of the popular principle of the work, descriptions of purely botanical species will be carefully omitted, while every effort will be made to bring together all the species and varieties which possess particular interest, either as decorative plants, or as subjects partaking of characters sufficiently striking to render them of some importance in a well-ordered collection.

All the information supplied will be of as full and explicit a character as possible. The Author, presupposing an entire ignorance of the subject on the part of his readers, will enter into details as thoroughly as the requirements of such an extensive family deserve, not only as regards the descriptions of the plants, but also, and especially, when referring to matters bearing on their cultivation. The alphabetical order is the one to which, in this instance, preference has been given, as it is considered that when references are needed the task is greatly simplified by its use.

It will, in the course of the publication, be noticed that exotic and British species are treated simultaneously. This step has only been taken after due consideration, and its acceptance cannot fail to satisfy the reader when it is explained that the reasons which prompted the Author to abandon the division adopted by most authors are these: First, that all Ferns, whether of British or of exotic origin, belong to one family, and that if the division between these two sections should be maintained on account of the diversity of habitats, there is no valid reason why sub-divisions—such as for Japanese, Australian, North American, Indian, South American, and other Ferns—should not equally be resorted to; and it is deemed advisable to avoid the complications which would naturally attend such an innovation. The second reason offered in favour of the unification bears on the cosmopolitan character of certain species which, though reputedly of British origin, are found equally wild in many other and very distant parts of the globe. This is particularly applicable to most of our Spleenworts, or Aspleniums, for we have it, on the authority of Beddome and other writers, that *Asplenium Adiantum-nigrum*, which is popularly but erroneously called the French Fern, is not only found throughout Europe, but also in Northern Asia, North and South Africa, Madeira, the Azores, the Canaries, the Cape de Verde Islands, St. Helena, Abyssinia, Afghanistan, and Java; while in Northern India it flourishes at Kashmir and Simla. The dwarf-growing *Asplenium viride* has been collected in all parts of Europe, as well as on the Himalayas and in North America. *Asplenium Ruta-muraria* is plentiful in Kashmir, Thibet, at the Cape, in Algeria, and in North America; while *A. septentrionale* is known to exist not only in Europe, from Norway to the extreme south, but also in Northern India, in Kashmir and Gurhwal; *A. fontanum* is found on the Himalayas, and *A. Trichomanes* is plentiful in the Neilgherries and in Southern India. The same remarks apply to *Cystopteris fragilis*, which, although essentially acknowledged as an European Fern, is found on the Himalayas, in Nepaul, in Siberia, in Asia Minor, in North and South America, in the West Indies, and in North and South Africa. Even our own Royal Fern, *Osmunda regalis*, is abundant on banks of rivers and streams on the Neilgherries and other high mountains on the western side of the Madras Presidency, India. The same may also be said of *Nephrodium spinulosum*, *N. Thelypteris*, and others which, although found in a wild state in all parts of Europe, are also natives of

India, America, and other parts very distant from one another. From the foregoing examples, to which, but for the want of space, we might add numerous other illustrations, it will readily be admitted that a satisfactory separation of British and exotic Ferns is a matter surrounded with insuperable difficulties. Ferns, it must be borne in mind, unlike most other plants, are found in a wild state all over the globe, and at various elevations.

Another remarkable peculiarity as regards the distribution of Ferns, is that each country appears to yield plants forming natural special sections. Thus, for instance, the power of producing crested, depauperated, cruciated, and other characters peculiar to forms of original species, either of an evergreen or of a deciduous nature, is much more developed among Ferns growing spontaneously in England than among those found in any other country. Whether these changes are due to the influence of the atmosphere, or whether they may be attributed to other agencies, the fact remains that scarcely a single species of Fern, native of the British Isles, has retained its normal characters throughout—all have become more or less addicted to variations; and that power of producing variable forms, which may possibly be a natural predisposition on the part of the said species, can hardly be ascribed to the effects of cultivation, since we find that most of these multifid, crested, and other forms, so numerous especially amongst the Scolopendriums, *Asplenium Filix-fœmina*, *Nephrodium Filix-mas*, *Aspidium angulare*, and *Polypodium vulgare*, have usually been met with in a wild state, comparatively few of them having originated among cultivated plants. To Japan we are indebted for the greater part of our hardy greenhouse Ferns; and most of these Japanese kinds, such as *Aspidium varium*, *A. falcatum*, *Nephrodium erythrosorum*, *N. opacum*, &c., all of which are evergreen and hardy, have a peculiarly glossy appearance and leathery or coriaceous texture, which characters are shared by very few of our own indigenous Ferns, and by scarcely any other exotic kinds. North America supplies us with Ferns mostly of a deciduous nature, the most remarkable of these being *Osmunda cinnamomea*, *O. Claytoniana* (*interrupta*), and *O.* (*regalis*) *gracilis*, *Onoclea sensibilis*, *O. germanica* (*Struthiopteris pennsylvanica*), *Adiantum pedatum*, *Dicksonia punctilobula*, and *Woodwardia areolata*. It is singular, however, that although the above-named are Fern-countries in every acceptation of the word, the growth of their indigenous species partakes of an herbaceous character exclusively, no Tree Ferns being known to grow spontaneously in any of the above-mentioned habitats. Even in North America, which is the home of the most gigantic Conifers, and whose forests contain, probably, the tallest-growing trees, arborescent Ferns are conspicuous by their absence. The production of these highly interesting and most imposing specimens of vegetation appears to be restricted to India, tropical America, New Zealand, and Australia. Tree Ferns natives of Australia and New Zealand are by far the best known to European cultivators, probably on account of the greater facility with which they are imported. Of all Tree Ferns, *Dicksonia antarctica* is undoubtedly the most popular in our collections. This is easily understood when notice is taken of the peculiarly fibrous character of its stem, which is naturally and densely clothed throughout its whole length with living roots, and which, on that account, may safely be, and generally is, simply cut above the surface of the ground, and shipped to Europe as a log of wood, and without any further preparation. In that way, and provided the operation takes place during the resting season, *Dicksonia antarctica* travels very well. The above treatment, however, is hardly applicable to other kinds of New Zealand and Australian Tree Ferns, such as Alsophilas and Cyatheas, whose stems, of a more woody nature, cannot with impunity be cut down at any length, and which, to ensure safe transit, require to be dug out of the ground with their roots, or at least the best part of them, thus making their importation much more difficult, and accounting, in a great measure, for their comparative scarcity in European collections. These latter remarks apply equally to Indian and tropical American Tree Ferns, though most of the species of Ferns with beautifully tinted and powdered fronds are natives of these countries. It is thence that the popular Gold and Silver Gymnogrammes, the magnificently-coloured *Pteris* (*quadriaurita*) *tricolor* and *P.* (*q.*) *argyræa*, as also the lovely *Adiantum tinctum*, *A. macrophyllum*, *A. polyphyllum* (*cardiochlæna*), *A.* (*tetraphyllum*) *Hendersoni*, *A.* (*tenerum*) *Farleyense*, and a host of others, have been introduced.

It must not be inferred from the above statements that only the Ferns at present in cultivation will be mentioned, for many species which were formerly cultivated in our collections, but which, nowadays, are very difficult to find, as well as Ferns which, though not in general cultivation, are deserving to be, and others only known in herbaria, but whose introduction is much to be desired, will also be included, in the fervent hope that a description of them may not only stimulate the cultivation of those sorts we already possess, but also eventually lead to the successful importation of other scarce and beautiful species and varieties.

Finally, that the book may be as complete as possible in every way, neither trouble nor expense has been spared to enrich it with numerous illustrations, all the more reliable on account of their having been drawn from living subjects.

CHAPTER II.

CLASSIFICATION FOR DECORATIVE PURPOSES.

FOR diversity of form, as also for variations in the colour of their foliage, no other family of plants can compare with Ferns; for, without disparagement to other plants, it is now generally admitted that these modest representatives of the Vegetable Kingdom, which have no bright flowers to enhance their beauty, are nevertheless of the greatest utility in all matters relating to decoration both in and out of doors. It is therefore readily understood why houses should be exclusively devoted to their cultivation.

As regards the effects produced by the variety in size and shape of foliage, there need be no misgivings as to the results of a combination; the bold foliage of some of the gigantic-growing kinds forms a striking yet agreeable contrast when in close proximity to the smaller-growing species and varieties. This is particularly well illustrated in the cases of the lace-like foliage of *Cheilanthes* (*myriophylla*) *elegans*, *Pteris scaberula*, *Davallia Novæ-zelandiæ*, *Gymnogramme schizophylla*, *Asplenium viviparum*, *Adiantum gracillimum*, and many other kinds, when opposed to the massive, shield-like form of *Platycerium grande*, of the elephant's-ear-shaped *Acrostichum* (*Hymenodium*) *crinitum*, of the various forms of *Marattia* and *Angiopteris*, and, above all, of the massive though very elegant foliage of the New Zealand, Australian, and tropical American Tree Ferns with which one frequently meets in well-ordered collections.

The variation in tints and colours to be found amongst Ferns, as belonging either to matured or to imperfectly-developed fronds, is so considerable that it gives ready means for producing, without much trouble, very pleasing contrasts and combinations. Some colours almost equal in brightness to that of many flowering plants are noticeable among Ferns, especially in the earliest part of their growth. The young and partly-developed fronds of *Adiantum Veitchii*, *A. macrophyllum*, *A. tinctum*, *A. fulvum*, and others, for instance, are endowed with most gorgeous hues; while the chameleon-like nature of the foliage of *A. rubellum*, which, from the most delicate pink, turns to a bright magenta, and finally changes to a glaucous-green tint of exquisite softness, shows us an interesting as well as extraordinary natural phenomenon most worthy of our closest observation. The beautiful bronzy and metallic tints which are peculiar to the young fronds of *Doodia media*, *D. aspera*, and its elegantly-crested form *multifida*, of the magnificent and vigorous *Adiantum polyphyllum* (*cardiochlæna*), *A. Sanctæ-Catharinæ*, and *A.* (*tetraphyllum*) *Hendersoni*, or of the specially striking *Didymochlæna truncatula*, or the charmingly dwarf *Lomaria L'Herminieri*, as well as those which distinguish the early vegetation of the superb *Davallia divaricata* (*D. polyantha* of commerce), are indeed among the most magnificent products of Nature. It is all the more interesting when we note that, before assuming the uniform green colour which they retain afterwards, the noble fronds of the last-named species invariably change from a bright claret to the deepest shade of crimson, a colour which also forms a natural network of a most pleasing nature, and entirely covers the young fronds of *Polypodium appendiculatum*, a species of South American origin which, with the exception of the colouring of its fronds, possesses the greatest analogy to our own native Polypody, *P. vulgare*. It may, to a certain extent, be objected that all these variations in colour belong to the early part of the vegetation only; but, considering that evergreen Ferns grow nearly all the year round, this objection is of very little consequence, as there is always a variety of colour among them.

Independently of the various tints above enumerated, the fronds of Ferns, when fully developed, exhibit a most extensive variety of shades of green, ranging from the dark colour of *Aspidium* (*Polystichum*) *setosum* to that of the soft, pea-green tint of the lovely *Adiantum æthiopicum* (*A. venustum* of commerce); while others remain all the year round beautifully glaucous, as in certain Pellæas (Platylomas), such as *P. cordata*, *P. calomelanos*, and *P.* (*cordata*) *flexuosa*, or as in the case of that popular and vigorous Polypody, *P. aureum*, and its scarcer form, *P. sporadocarpum*, or, again, as in the delightfully dwarf-growing *P. glaucophyllum*, whose lovely, bluish fronds are further ornamented by the extremely rich colour of its fructification. To the above-named plants, with permanent-coloured foliage, we may also add the lovely, pendulous *Selaginella uncinata* (*S. cæsia* of commerce), and the upright, climbing *S. Willdenovii* (*S. cæsia arborea* of commerce), two species having their foliage of a most beautiful peacock-blue colour, which they retain all the year through. The greatest amount of pleasure and interest is easily derived from a collection of Gymnogrammes, provided a constantly dry corner of the warm house can be devoted to them. These Gold and Silver Ferns are not only rendered attractive by the singularity of their powdered nature, which is mostly shown on the under-surface of their fronds—white, as in *G. calomelanos*, *G. spectabilis*, and *G. tartarea;* lemon-coloured, as in *G. pulchella*, and the heavily-crested form *G. Wettenhalliana*, in which case, as also in the silver-white *G. calomelanos peruviana* (*G. peruviana argyrophylla* of commerce), the powder is suffused over both surfaces of the fronds; or a beautiful golden colour, as in *G. calomelanos chrysophylla*, and its numerous varieties (*Laucheana*, *Alstoni*, and the beautifully-crested *Parsonsii* for instance)—but some, and we may say most, of them are strong and compact growers, and very well adapted for decoration in a general way.

Garden varieties, which have of late years sprung up in great quantities among exotic as well as among native kinds, also materially add to the list of Ferns worthy of cultivation. See, for instance, what a beautiful object, when grown in a hanging basket, *Adiantum cuneatum grandiceps* makes; in this case, the weight of the tassels produced at the ends of the fronds gives the plant a most elegant and ornamental habit; while the naturally dwarf-growing *A. Luddemannianum*, with the numerous little corymbs formed by the agglomeration of its emerald-green pinnules, may be acknowledged as a real vegetable jewel. From its general appearance, this lovely and most interesting plant could hardly be taken as an offspring of *A. cuneatum*, yet such undoubtedly is the case, since it is totally devoid of the creeping rhizomes which characterise its nearest ally, *A. Capillus-Veneris*, to which it appears more closely related. What could be prettier than many of the numerous forms of *Asplenium Filix-fœmina*, or of *Nephrodium Filix-mas?* while exquisite selections can be made out of the many varieties of *Aspidium* *angulare*, and also of *Scolopendrium vulgare*, most of which are of garden origin.

The division of the cultivated Ferns into several sections will enable the reader to form a much better estimate of the various uses to which plants belonging to each separate section can be put. Before commencing the description of the species and varieties of known Ferns, we will, in the following chapters, endeavour to make the reader acquainted with the peculiarities of the plants belonging to the sections, as follows: (1) Tree Ferns; (2) Gigantic Non-arborescent Ferns; (3) Small-growing Ferns; (4) Ferns with Coloured or Tinted Fronds; (5) Variegated and Crested Ferns; (6) Gold and Silver Ferns; (7) Climbing, Trailing, and Drooping Ferns; (8) Filmy or Transparent Ferns; (9) Viviparous or Bulbil-bearing Ferns; and (10) Curious Ferns, whose appearance is totally distinct from what a Fern is generally supposed to be, viz., the embodiment of grace and elegance.

CHAPTER III.

TREE FERNS.

HOWEVER rich in species of herbaceous Ferns some European countries are, it is a fact that no Tree Ferns are found in a wild state in Europe. In that part of the world, the nearest approach to an arborescent Fern is *Dicksonia* (*Balantium*) *Culcita*, which is found indigenous in Madeira, where it grows plentifully in swampy places; at least, such an inference may reasonably be drawn from the fact that a quantity of *Hymenophyllum tunbridgense* is generally found growing on the crowns which are imported into this country.

For the greater part of the Ferns belonging to this the first section we are mostly indebted to the mountainous regions of Australia, where they grow in shady ravines or in valleys where the atmosphere is constantly humid. There they attain almost incredible dimensions; and although when under cultivation in Europe these same Australian species cannot get to such extraordinary sizes, they may, nevertheless, be considered as the monarch of the arborescent greenhouse vegetation. South America, China, India, and South Africa, are all countries where, to a certain extent, Tree Ferns are produced; but these have never become as popular under cultivation as those from Australia, where the Stuart and Gawler Ranges supply in abundance the particularly straight-stemmed *Alsophila australis*, as Queensland produces *A. Cooperi*, a species peculiar on account of its slender and generally very straight stem, which, contrary to that of nearly all other Tree Ferns, is totally devoid of aërial roots. The Blue Mountains and the Liverpool Range, in New South Wales, produce the handsome *Dicksonia Youngiæ*, particularly striking through its rough, slender stem, and its long, plumose fronds, which are peculiarly borne on stout stalks, covered with brown hairs of a long and shaggy nature. But these Tree Ferns of Australia proper can hardly be kept apart from those of New Zealand and Tasmanian origin, for, besides succeeding admirably under similar treatment, they are likewise frequently found scattered over the different regions just mentioned.

However productive of Tree Ferns other parts of Australia may be, Victoria is the home of the kinds of most imposing dimensions. It is in that country that *Dicksonia antarctica* appears to attain its utmost size; handsome trunks of that species, 50ft. to 60ft. in height, and surmounted by heavy crowns of ample foliage, being frequently met with. This, however, is not the only place where that truly magnificent Tree Fern luxuriates, as it is equally found in several parts of Tasmania or Van Diemen's Land, notably on Mount Wellington, where it grows in abundance, and where it also attains extraordinary dimensions. In both places the habitats of the Tree Ferns are of such a damp nature that they may be said to be enveloped in perpetual mist, an assertion fully borne out by the fact that many of the trunks imported into this country are either partially or totally covered with little *Hymenophyllum rarum*, and the equally diminutive, though extremely pretty, *Trichomanes venosum*, both species which could not possibly luxuriate under any other atmospheric conditions.

The hardiness of *Dicksonia antarctica* is surprising; it has even been found with its head heavily laden with snow. Notwithstanding this, however, its culture out of doors in this country does not appear to have met with any decided success, although we hear of its standing uninjured, yet without protection, in parts of Ireland, while some large stems have lately been planted by Mr. J. C. Williams, on his magnificent estate at Caerhays Castle, St. Austell, in Cornwall, where they promise to do very well.

Besides *Dicksonia antarctica*, New Zealand might also claim the production of the Silver Tree Fern, *Cyathea dealbata*, a kind with generally a straight stem and large fronds, which, owing to the silvery colour of their under-surface, are very attractive; *C. medullaris*, perhaps the most gigantic, or at least the most rapid-growing, Tree Fern known, with stalks very robust, and of a beautiful ebony-black colour; and *C. Smithii*, an arborescent kind, with fronds more delicately divided than in most other Tree Ferns. *Dicksonia squarrosa*, with its very slender stem, and fronds disposed in a nearly horizontal position; *D. fibrosa*, which appears to be simply a crisp form of *D. antarctica;* and the less-known *D. lanata*, whose stalks are densely clothed at the base with large, white, chaffy scales, are also natives of New Zealand, where they form the bulk of the forest vegetation as regards arborescent Ferns.

Although the majority of the most popular Tree Ferns are, as we have shown, natives of these comparatively cool regions, other kinds are equally numerous in more tropical countries. In the East and West Indies, in the Eastern Archipelago, and in South America, they are plentiful enough, and in the majority of cases they are only found growing at high elevations; they are, therefore, nearly, if not quite, as hardy as those from Australia and New Zealand, and their scarcity in collections can only be attributed to the difficulties attending their importation into this country. In some cases, the stems of certain species are so slender that they mostly arrive in this country when already dead, all the substance having been dried out of them; whereas, in other instances, the crowns are formed of such a pulpy substance, that long before the stems have reached their destination decomposition has already taken place, and the plants are virtually dead. Besides the nature of the stems, a great deal also depends on the time of year at which these plants are taken up from their native places. It is by far the best way for the collector to send them soon after they have matured their growth, following, in that respect, a general rule which allows us to take up successfully any of our own trees and shrubs when they are at rest.

Provided Tree Fern stems arrive in good condition, they rapidly become handsome plants, and do not require the amount of attention which most people imagine they do; for, although deprived of their original roots, the structure of the stems, with very few exceptions, is such that, when under the influence of constant moisture, and, in some cases, subjected to a little heat, fresh roots soon make their appearance all around the stems. Tree Ferns should, as soon as they arrive, be put in pots or tubs proportionate to their size, and be fixed firmly into these, the stems being put sufficiently deep to ensure their being held securely by the ramming of the soil, which should consist of a mixture in equal parts of rough fibrous peat and turfy loam. Water should then be sprinkled over them, sparingly at first, yet in sufficient quantity to keep them moderately but constantly moist; but no water should be allowed to collect and remain in their crowns. These sprinklings should become more frequent, and also more copious, as the new roots are produced and the new fronds are developed—indeed, until the plants are perfectly established.

From the description of their native habitats, it will naturally be inferred that Tree Ferns under cultivation require an abundance of water along their stems, which, at all times of the year, should be kept constantly moist. Provided they receive sufficient water, they are not very particular as to their soil, for we have seen them thriving equally well in rough, peaty soil and moss combined, or in pure loam. Perhaps the most peculiar point in connection with Tree Fern culture is that the stems of *Cyathea dealbata* imported from New Zealand are invariably found to have been growing in very stiff clay, yet, under cultivation, these same Ferns succeed best when planted in peat.

When grown in pots or in tubs, Tree Ferns may very easily be kept within bounds; but when planted out in the conservatory, they require special attention to prevent them from attaining too large a size. In this case, the best plan to be adopted, by which to prevent excess of growth, is to cut annually round their stems at a distance of about 3ft., with the spade, a sort of trench, which will be found sufficient to check their exuberance. By so doing, the plants will be as if kept in tubs. This root-pruning should be done between the months of November and February, according to the temperature of the house in which the Ferns are growing, and before active vegetation commences. In spite of all that attention, it sometimes happens, however, that Tree Ferns attain too large dimensions for the place which was originally intended for them. In such cases, there are only two ways of getting over the difficulty: one consists in raising the structure in which the plants are growing; the other, which is far less expensive, is the reduction of the stems, an operation which may be performed with safety at any time between the beginning of November and the middle of February, provided that the trunks thus operated upon are afterwards subjected to rational treatment. In the first place, it is of the utmost importance that the operation should be carried

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out while the plants are dormant, or failure will be the result. If done early in winter, just after the plants have gone to rest, they will, during three or four months, present a wretched appearance—in fact, look like freshly-imported stems—as, in all probability, they will lose their foliage, and not produce any for a considerable time. This, however, will not happen if the operation is performed during January or February, and just before they make their annual start, for, in that case, they usually keep their old foliage on until a crown of young fronds is developed, when the old foliage naturally disappears ; but should the plants even be deprived of their old fronds sooner than was anticipated, they would only remain unsightly for a comparatively short time.

Methods of preparing the stems for reduction are numerous ; getting them to root in a bed of moss for a season previous to amputation has been advocated, but for this there is really no necessity. It is evident that if imported stems, cut off in their native habitats without any preparation, and subjected to a long journey, can be induced to make good plants in one season, stems under altogether more favourable circumstances, cut off when still at rest but approaching their growing season, must produce results at least quite as satisfactory. The first Tree Fern stems which we saw treated in this way consisted of *Dicksonia antarctica*, *D. squarrosa*, *Cyathea medullaris*, and *Alsophila australis.* These were in the once famous Fernery belonging to Mr. T. Bewley, of Dublin ; they were cut off from 2ft. to 3ft. above the ground and re-planted close to the stumps, which were left undisturbed. None of these stumps ever made any growth, although, under ordinary treatment, it is not rare to notice *Dicksonia squarrosa* producing side growths ; but the shortened stems succeeded admirably. Since then we have many times had the opportunity of testing the effects of similar operations, and we have noticed that subjects treated in that way succeed better when planted out than when grown in pots or tubs. Although most Tree Ferns stand such reduction very well, *Dicksonia antarctica* suffers least—a fact easily accounted for when one considers the enormous quantity of aërial roots of which the trunk is formed, and which, when in proximity to moisture, have the power of absorbing an amount of atmospheric food sufficient to stimulate the development of a good head of fronds.

The cut-off portion of the stem, which, for safety, should be at least equal

in height to the length of the fronds, should be planted permanently in a previously-prepared bed. Thorough drainage is indispensable, and it should be made of clinkers, intermixed with brick rubbish and coarsely-broken charcoal, so as to allow the more than ordinary amount of water which must be given to pass off freely. The drainage should be covered with a layer of moss, preferably sphagnum. The shortened stem must be set on the drainage, and then should be securely fixed thereon by the addition of some similar material placed around its base. Upon this a mixture of two-thirds peat and one-third loam should be placed, and arranged so as to form a little mound around the stem. This disposition will prevent the great quantity of water resulting from copious and frequent syringings from keeping the base too wet until the fresh young roots have attained a certain development, after which little fear need be entertained on that score. These syringings should be administered carefully over the whole surface of the trunks, so as to favour the development of fresh roots in equal proportion all around the stems. It is from these syringings, given early in the morning and late in the evening, that the greatest benefit is derived. A light shading should also be applied during the hottest part of the day, principally in early spring, and until the new fronds have attained that state of hardness which will enable them to stand a much greater amount of light than is generally supposed to be good for them.

The above treatment is also that generally adopted, and with the most satisfactory results, in the case of newly-imported stems. These are sometimes surrounded with a layer of sphagnum, which undoubtedly favours the emission and development of new roots ; but unless such packing is carefully performed by experienced hands, it is productive of much mischief, as when—by the repeated use of the syringe, and likewise through the slow but unavoidable shrinking of the mossy material which is continually being washed away—the roots become exposed, these, besides presenting an untidy appearance, are also subjected to the danger of drying much more rapidly than those of plants otherwise treated, and of losing their vitality in a singularly short space of time.

The watering of Tree Ferns, when they are well established, should, whenever practicable, be done from the very crown downwards, as batches of fresh young roots are invariably produced at the base of each new set of fronds.

In the following lists of thirty temperate and thirty tropical species, we have, so far as practicable, endeavoured to include all the best-known Tree Ferns, and have marked with an asterisk (*) those species which, although to a certain extent arborescent, seldom form a trunk more than from 2ft. to 3ft. in height.

Temperate Species.

- Alsophila australis.
  - Cooperi.
  - excelsa.
  - Leichardtiana.
  - lunulata.
  - Rebeccæ.
  - Scottiana.
- Brainea insignis.*
- Cyathea Cunninghami.
  - dealbata.
  - medullaris.
- Dicksonia antarctica.
  - arborescens.
  - (Cibotium) Barometz.*
  - Berteroana.
  - fibrosa.
  - lanata.
  - (Cibotium) regalis.
  - (Cibotium) Schiedei.*
  - squarrosa.
  - Youngiæ.
- Hemitelia (Alsophila) capensis.
  - setosa.
  - (Cyathea) Smithii.
- Lomaria Boryana.*
  - B. cycadoides.*
  - discolor.*
  - gibba.*
- Todea arborea.*
  - Fraseri Wilkesiana.*

Tropical Species.

- Alsophila aculeata.
  - armata.
  - aspera.
  - contaminans.
  - glabra.
  - infesta.
  - paleolata.
  - procera.
  - pruinata.
  - radens.
  - sagittifolia.
  - Tænitis.
  - villosa.
- Cyathea arborea.
  - canaliculata.
  - Drègei.
  - excelsa.
  - Hookeri.
  - insignis (Cibotium princeps).
  - integra.
  - Serra.
  - sinuata.
- Dicksonia chrysotricha.
  - Menziesii.
  - Sellowiana.
  - Wendlandi (Cibotium spectabilis).
- Hemitelia grandifolia.
  - horrida.
  - Karsteniana.
  - speciosa.

CHAPTER IV.

GIGANTIC NON-ARBORESCENT FERNS.

CONSIDERED simply from a decorative point of view, the section next in importance to that exclusively composed of Tree Ferns is the one including all the large-growing non-arborescent kinds; and with the exception of *Dicksonia* (*Balantium*) *Culcita* and *Woodwardia radicans*, both natives of Madeira and the Azores, no other Ferns belonging to this group are of European origin. For the ornamentation of conservatories and winter gardens of large dimensions, the numerous, and in many instances particularly striking, plants which form this group are unequalled for diversity of foliage; and whatever their habit may be—drooping, as that of *Woodwardia radicans*, *Asplenium caudatum*, *A. longissimum*, and *Nephrolepis davallioides furcans;* spreading, as that of several kinds of *Angiopteris* and *Marattia*, *Dicksonia* (*Dennstædtia*) *davallioides Youngii*, *Acrostichum* (*Stenochlæna*) *scandens* and *Davallia hirta cristata;* erect, as that of *Todea barbara* (*africana*); with massive foliage, as *Asplenium Nidus* and its variety *australasicum;* or with light and finely-cut fronds, as *Dicksonia cicutaria* and *Polypodium rugulosum* —they all come in for their share of usefulness, and some of them are found indispensable where spacious houses have to be filled. What can have a more tropical and really regal appearance in a conservatory than a naturally-arranged group of the large-growing Davallias—*D. divaricata* (*polyantha*), for instance, which one cannot help admiring, especially when furnished with its finely-bronzed fronds, which, bright crimson in their youth, turn with age to a beautiful dark, glossy green? *D. solida*, too, has large, pendulous fronds, with gracefully-cut pinnæ of a light, shining green, which contrast strikingly with those of the well-known and deservedly-appreciated *Asplenium Nidus*, remarkable alike for the extraordinary substance of its broad, entire, glossy fronds, and for the unusual way in which they are disposed, leaving at their base a circular hollow, from which distinctive character the popular name of "Bird's-nest Fern" originated. Where such groups exist, and when they are surmounted by the noble head of a light and spreading Tree Fern, as in the charming Fernery at Park Hill, Streatham, where a gigantic *Dicksonia insignis* (*Cibotium princeps*) towers above the whole Fernery in a majestic manner; or where, as at Chatsworth, the most conspicuous and elevated position is occupied by *D.* (*Cibotium*) *Barometz*, the Vegetable Lamb, the effect is admirable. When, besides the above-named plants, the intervening spaces are filled with such Ferns as *D. cicutaria*, a kind with very finely-cut and elegantly-drooping fronds, or with the elegant-habited *Aspidium* (*Polystichum*) *capense*, the no less curious *Pteris laciniata* (*Ghiesbreghtii*), whose soft, succulent stems and gigantic fronds, of a peculiarly pale green colour and soft texture, possess a most singular aspect, such groups, intermixed with a few noble fronds of Marattias, which are usually borne on stout, robust, fleshy stalks, from 10ft. to 12ft. high, produce a sight never to be forgotten. These gigantic non-arborescent Ferns are sufficiently numerous to allow for their disposition in all parts of the Fernery. While the common *Polypodium aureum* and its beautiful variety *sporadocarpum*, *P. Heracleum*, and *Acrostichum* (*Stenochlæna*) *scandens* delight in a moderately dry position, such handsome kinds as *Acrostichum aureum*, all the Angiopteris and Marattias, as well as *Todea barbara* (*africana*), are particularly well adapted for growing in the dampest places. Such diversity of forms, sizes, and habits, makes a most effective display.

The variety of colours belonging to the foliage of the various kinds of which this group is composed is equally remarkable. How many intermediate tints are there not, for instance, between the light, glaucous colour of *Davallia* (*Microlepia*) *platyphylla* and the very dark glossy green of *Lomaria Boryana cycadoides*! Besides the beautiful metallic or bronzy hue peculiar to the foliage of the handsome *Didymochlæna truncatula*, *Woodwardia orientalis*, and *Nephrodium* (*Lastrea*) *erythrosorum*, there are also shades of green sufficient to make of themselves a most interesting group.

Another and most plausible reason may here be given for favouring the culture of these gigantic non-arborescent Ferns, inasmuch as, if they do not actually require the abundance of light which must be allowed to many other kinds of plants, they accommodate themselves to the effects of it, as Tree Ferns usually do. It naturally follows that in Ferneries in which arborescent species, and also Ferns belonging to this section, are sufficiently represented, the necessity for artificial shading is considerably reduced, as under the shelter of these robust growers, many of the more delicate among the smaller kinds are found to thrive admirably without needing any further shading. Although all these kinds may be grown in pots, and under such treatment form very beautiful objects, it is only reasonable to state that they are all much more adapted for planting out in the Fernery, as, under such conditions, the development of their gigantic fronds is not impeded by occasional neglect, the effects of which, often irreparable, are always much more apparent when the plants have their roots bound round the sides of a pot, than when they are allowed to roam over a practically unlimited space.

With a view to helping in the plantation of the Fernery, we here give a list comprising no other species than those which will thrive in a minimum temperature of 55deg. during the winter, so that all of them can be safely grown together. According to the position which they should occupy in the house, and also to suit their peculiar requirements, the large-growing non-arborescent Ferns may be divided into three sections. The first, and also the most extensive, comprises only plants whose requirements are easily satisfied, which thrive well in the ordinary mixture of soil, such as that used for Ferns in general, and which will succeed in any part of the Fernery: these are, of course, the sorts most frequently met with, and are marked with an asterisk (*) in the accompanying list. The second section consists either of plants that require drier treatment, or else of kinds of a more drooping habit; in any case, they are all Ferns which are benefited by being planted on elevated positions: these are marked with a dagger (†). The semi-aquatic or swamp-loving sorts, which are about the strongest growers of all, form a third and last section: these, which in the list are marked with a parallel (‖), delight in being planted in the lowest part of the Fernery, and thrive best where the ground, which should be of a spongy and not retentive nature, can be permanently kept in a naturally damp condition. In addition to abundance of water at the roots, the Ferns belonging to this last section derive the greatest benefit from occasional syringings overhead during the summer. The figures indicate the average height in feet.

- Acrostichum aureum ‖, 6.
  - Blumeanum *, 4.
  - canaliculatum †, 4.
  - (Olfersia) cervinum *, 4.
  - Herminieri *, 4.
  - (Stenochlæna) scandens †, 6.
  - tenuifolium †, 5.
- Adiantum polyphyllum (cardiochlæna) *, 6.
  - tenerum *, 4.
  - trapeziforme *, 4.
- Angiopteris evecta ‖, 12.
  - e. pruinosa ‖, 12.
- Aspidium capense *, 4.
- Asplenium caudatum †, 4.
  - longissimum †, 7.
  - Nidus †, 6.
  - N. australasicum †, 8.
  - obtusatum lucidum *, 4.
- Blechnum brasiliense *, 6.
- Ceratopteris thalictroides ‖, 4.
- Davallia divaricata †, 5.
  - hirta cristata *, 6.
  - platyphylla *, 6.
  - solida ornata †, 4.
- Dicksonia adiantoides *, 5.
  - (Cibotium) Barometz *, 10.
  - cicutaria *, 5.
  - Culcita ‖, 6.
  - davallioides Youngii *, 7.
- Didymochlæna lunulata *, 4.
- Lomaria Boryana cycadoides *, 4.
  - procera chilensis *, 5.
- Marattia alata ‖, 10.
  - Cooperi ‖, 8.
  - fraxinea elegans ‖, 8.
- Marattia Kaulfussii ‖, 10.
  - laxa ‖, 7.
- Nephrodium (Aspidium) macrophyllum †, 5.
  - patens *, 4.
  - setigerum *, 6.
  - s. cristatum *, 3.
  - s. tenericaule *, 3.
  - Standishii *, 5.
- Nephrolepis acuta †, 6.
  - davallioides †, 6.
  - d. furcans †, 5.
  - rufescens tripinnatifida †, 5.
- Polypodium aureum *, 6.
  - a. sporadocarpum *, 5.
  - conjugatum (coronans) †, 4.
  - diversifolium †, 6.
  - Heracleum †, 5.
  - lachnopus †, 5.
  - nigrescens *, 4.
  - ornatum *, 6.
  - punctatum rugulosum *, 5.
  - subauriculatum †, 8.
  - subpetiolatum *, 5.
  - verrucosum *, 5.
- Pteris moluccana †, 6.
  - Ouvrardi *, 5.
  - quadriaurita *, 5.
  - q. argyræa *, 5.
  - tremula *, 6.
  - t. flaccida *, 5.
  - t. foliosa *, 5.
- Thyrsopteris elegans *, 7.
- Todea barbara (africana) ‖, 8.
- Woodwardia orientalis †, 5.
  - radicans †, 7.

CHAPTER V.

SMALL-GROWING FERNS.

IN the Vegetable as well as in the Animal Kingdom nearly all families have their pigmies as well as their gigantic representatives, and Ferns are certainly no exception to the general rule. If Tree Ferns and other gigantic-growing kinds which form the subjects of the two preceding chapters are all of exotic extraction, small-growing Ferns, on the contrary, are abundantly found in Europe, and many of them may even be said to have their natural home in the British Isles. Indeed, some genera are composed almost exclusively of dwarf-growing species — such, for instance, are *Actiniopteris*, *Cheilanthes*, *Doodia*, *Nothochlæna*, *Pellæa*, *Woodsia*, and others — all of which are of peculiarly neat and compact habit. Small-growing Ferns, however, are not confined to special genera, as there are also others more extensive, in which vigorous-growing kinds are in close proximity to most interesting species of very diminutive stature, such as we note in *Davallia parvula*, a little gem, which in Borneo entirely covers the surfaces of trees with a uniform thick carpet of its pretty and curious little fronds, produced from and disposed on tiny little rhizomes of a particularly wiry nature. In this genus, which comprises such robust-growing species as *D. divaricata*, *D. solida*, *D. pallida* (*Mooreana*), and others, we also note *D. alpina*, a lovely species of Malayan origin: this delights in extending its more fleshy rhizomes over the rocks, which it covers with its barren and fertile fronds, seldom exceeding a few inches in height, and of very distinct shape and size. The more extensive genus *Acrostichum*, again, furnishes us with striking examples of dwarf-growing kinds, such as the very pretty little *A.* (*Rhipidopteris*) *peltatum*, and its delicately-divided variety *gracillimum*, scarcely 3in. high, classed with such robust species as *A. aureum*, *A. scandens*, and others. These pretty dwarf representatives of a genus particularly known through its most vigorous-growing members, as well as the above-named Davallias, are not by any means difficult to cultivate ; but they appear to entertain the greatest dislike towards spacious and lofty structures, and to allow for their welfare it is almost indispensable to provide for them accommodation under a bell glass or in a case of small dimensions, in which a given amount of uniform moisture may be constantly maintained.

Lomaria, *Pteris*, *Polypodium*, *Nephrodium*, and other equally popular genera, which comprise many very large-growing kinds, are equally noted for their dwarf representatives. The deliciously violet-scented North American *Nephrodium fragrans*, for instance, is well worthy of a place in every collection, however limited in dimensions this may be ; its tufted habit, showing narrow, lanceolate fronds, seldom exceeding 4in. in length, is extremely pretty: while the equally pretty tropical American *N. sanctum*, which is now so very seldom met with in collections, is particularly attractive and interesting on account of its dwarf size and its dark, finely-cut fronds, which are disposed in rosettes, and which give the plant quite a unique appearance. *Pteris scaberula*, a native of New Zealand, is another of these lovely dwarf-growing Ferns, and differs materially in size and habit from most of the other numerous species which form this really popular genus. When the name of *Lomaria* is mentioned, the mind is naturally carried to such strong-growing plants as the well-known *L. ciliata*, *L. gibba*, *L. procera chilensis*, and others ; but it must not be forgotten that the genus also comprises such gems as *L. alpina*, and also the charming *L. Germainii* (*crenulata*), from Japan. Both species are evergreen and very hardy, and although of exceedingly dwarf habit, measuring but a few inches in height, they are nevertheless found remarkably useful for the decoration of the cool Fernery, where, their foliage being of a very lasting nature, they make a fine display all the year round.

In the very extensive and most deservedly popular genus *Adiantum*, we find, by the side of such tall and robust-growing kinds as *A. polyphyllum* (*cardiochlæna*), *A. pulverulentum*, *A. tenerum*, *A. trapeziforme*, and others, some pretty and thoroughly distinct species and varieties of remarkably dwarf habit. If we take first the kinds which rank as species, we find foremost among them the very curious and always attractive, kidney-shaped *A. reniforme*, from Madeira and the Azores, and *A. r. asarifolium*, from the Bourbon Islands and Madagascar. Although this variety, which requires more heat than the type for its perfect development, produces fronds of the same shape as those of *A. reniforme*, but nearly as large again, these seldom attain more than 6in. in height. Then there are the gold- and the silver-dusted Maidenhairs, *A. æthiopicum sulphureum* and *A. æ. scabrum*, both natives of Chili, and seldom exceeding a few inches in height; while the New Zealand *A. assimile* and its crested form are particularly pretty dwarf Ferns, provided with underground rhizomes, making in the cool-house, and especially when grown in hanging baskets, a most agreeable display of very elegant little fronds. Our own British Maidenhair, *A. Capillus-Veneris*, is another very fair example of dwarf kinds: when grown in a warm-house, which treatment appears to suit its requirements very well, it attains, it is true, larger dimensions; but when planted in the cool-house, and especially when its thick rhizomes cling to the rockwork, its fronds seldom get more than 5in. or 6in. in length. This lovely species has produced several very handsome varieties, and among them two of very dwarf habit, which are respectively named *A. C.-V. daphnites* and *A. C.-V. fissum.* These two varieties have been raised in this country, and are remarkably well adapted for growing on small rockwork, or for covering a brick wall in the cool Fernery, as both plants grow from 4in. to 6in. only—the former with erect fronds, whose pinnules, of a glaucous-green, are agglomerated towards the apex, where they become fasciated; whereas the latter, of a totally different aspect, has very finely-cut fronds, with deeply-lacerated pinnules. It is particularly remarkable, as regards this latter variety, that whereas whole walls in greenhouses are, in some private places in America, completely covered with it, and although it has been in commerce several years, yet it has not become very popular with the majority of amateurs in this country. Among the numerous forms of *A. cuneatum* which from time to time have been found among seedlings, and which under cultivation retain their peculiarly dwarf character, we note *A. c. mundulum* and *A. c. Pacotti.* Both of these are of dwarf habit, and their fronds, which are produced in profusion, are erect, stiff, and of a much harder texture than those of any other kind belonging to the same genus; on that account they are most useful for bouquets and buttonholes, as well as for table decoration. *A. Victoriæ* is another dwarf-growing kind, which originated among seedlings raised from stronger-growing species that had already been a long time in cultivation. Its fronds, which are short and numerous, bear pinnæ as large as those of the better-known and general favourite *A. tenerum Farleyense;* they are of a most pleasing light green colour, and when mature contrast beautifully with the ever-coming and partly-developed ones, which are of a light claret tint, gradually gaining a yellowish tinge previous to assuming their permanent light green colour. *A. Luddemannianum* and *A. Legrandi* are also variations from *A. cuneatum*, seldom attaining more than 5in. or 6in. Both are of very compact habit, and the latter appears to be a contracted form of the well-known *A. c. gracillimum*, from which it differs in having its fronds much shorter and more compact, though quite as finely developed. While in a young state, and during their partial development, these fronds are of a lovely red colour, and the plant has the appearance of being thickly studded all over with innumerable little beads of various tints of pink and red.

Although the majority of the dwarf-growing Ferns may be said to be of exotic origin, some of the prettiest and most interesting species amongst them are indigenous to this country. These, with but very few exceptions, belong to the genera *Asplenium*, *Cystopteris*, and *Woodsia*. It is remarkable that amongst the Aspleniums, most of, if not all, the dwarf-growing kinds, such as *A. Ceterach*, *A. fontanum*, *A. germanicum*, *A. lanceolatum*, *A. Ruta-muraria*, *A. Trichomanes*, and *A. viride*, appear to have a predilection for growing on old walls. According to Col. Beddome, who has made the Indian Ferns a special study, and who has published an excellent and most elaborate work on these plants, divided into "Ferns of British India" and "Ferns of Southern India," most of the above-named species are also found very extensively in many parts of India, and growing in positions exactly similar to those which they prefer here. The Cystopteris and the Woodsias, either of British or of North American origin, also form a considerable addition to the list of dwarf-growing Ferns; but, although the above-named genera and the genus *Doodia* contain some of the prettiest among the many choice Ferns of small dimensions, the great bulk of species proper forming this class is contained in the genus *Pellæa* (*Platyloma* of commerce), the representatives of which have pretty fronds, mostly of a glaucous hue, handsomely shaped, borne on thin, wiry stalks, varying in colour from a dark prune to shining black. Although a few of the stronger-growing kinds among these are natives of Australia, the majority of them come from North America, as do also most of the Cheilanthes and Nothochlænas of small dimensions. It is obvious that, besides being highly interesting themselves, the Ferns forming this section possess over many other stronger-growing kinds an advantage which should not be overlooked, inasmuch as a greater number of them can be accommodated in a given space; and the fact that they do not require any more special attention than larger kinds should be conducive to their more general cultivation, wherever a suitable place can be made for them.

A list is appended in which the best and most distinct species and varieties are classified, according to their requirements, for stove, greenhouse, and outdoor Ferneries. The day and night temperatures of the stove and greenhouse are here given. STOVE—Summer: Night, 60deg.; day, 75deg. Winter: Night, 52deg.; day, 60deg. GREENHOUSE—Summer: Night, 50deg.; day, 60deg. Winter: Night, 40deg.; day, 50deg.

FOR STOVE.

Acrostichum conforme.
    Herminieri.
    peltatum.
    p. gracillimum.
    spathulatum.
Actiniopteris radiata.
    r. australis.
Adiantum cuneatum Legrandi.
    c. Luddemannianum.
    c. mundulum.
    c. Pacotti.
    diaphanum.
    reniforme asarifolium.
    Victoriæ.
Asplenium formosum.
    fragrans nobile.
    obtusilobum.

FOR GREENHOUSE.

Adiantum æthiopicum (assimile).
    æ. scabrum.
    æ. sulphureum.
    Capillus-Veneris.
    C.-V. cornubiense.
    C.-V. daphnites.
    C.-V. fissum.
    glaucophyllum.
    monochlamys.
    reniforme.
Asplenium alternans.
    flabellifolium.
    monanthemum.
Cheilanthes farinosa.
    fragrans.
Davallia heterophylla.

FOR OUTDOOR FERNERY.

Asplenium Ceterach.
    fontanum.
    germanicum.
    lanceolatum.
    Ruta-muraria.
    septentrionale.
    Trichomanes.
    viride.
Cryptogramme crispa.
Cystopteris alpina.
    bulbifera.
    fragilis.
    f. Dickieana.
    f. sempervirens.
Lomaria Spicant.
    S. Aitkiniana.
    S. concinna.

For Stove (*cont.*).

- Asplenium paleaceum.
  - pumilum.
  - Sandersoni.
  - viviparum.
- Cheilanthes radiata.
  - (Nothochlæna) tenuis.
- Davallia alpina.
  - parvula.
  - pedata.
- Fadyenia prolifera.
- Nothochlæna ferruginea.
  - flavens.
  - nivea.
  - sinuata.
  - trichomanoides.
- Pellæa profusa.
- Polypodium glaucophyllum.
  - lycopodioides.
  - piloselloides.
  - reptans.
  - stigmaticum (venosum).
  - vacciniifolium.

For Greenhouse (*cont.*).

- Davallia Novæ-Zelandiæ.
- Doodia aspera.
  - a. multifida.
  - caudata.
- Lomaria alpina.
  - Germainii (crenulata).
- Nephrodium fragrans.
  - sanctum.
- Nothochlæna Eckloniana.
  - hypoleuca.
  - lanuginosa.
  - Marantæ.
- Pellæa alabamensis.
  - andromedæfolia.
  - atropurpurea.
  - Breweri.
  - Bridgesii.
  - gracilis.
  - rotundifolia.
  - ternifolia.
- Polypodium rupestre.
- Pteris scaberula.

For Outdoor Fernery (*cont.*).

- Lomaria Spicant cristata.
  - S. imbricata.
  - S. lineare.
  - S. projectum.
  - S. strictum.
  - S. trinervo-coronans.
  - S. Wilsoni.
- Nephrodium pseudo-mas ramosissimum.
- Polypodium alpestre flexile.
  - Dryopteris.
  - Phegopteris.
- Scolopendrium vulgare densum.
  - v. Kelwayi.
- Woodsia caucasica.
  - glabella.
  - hyperborea (alpina).
  - ilvensis.
  - obtusa.
  - oregana.
  - scopulina.

CHAPTER VI.

FERNS WITH COLOURED OR TINTED FRONDS.

FOR the formation of this section we are again indebted exclusively to the exotic species; as, with the exception of the variations in shades of green, no Fern of European origin finds a place in the list. Yet Japan vies with tropical and North America, as well as with the East and West Indies, in the spontaneous production of such Ferns, some of which are possessed of a foliage which, for either richness of colour or delicacy of tints, is as greatly admired as many of our flowering plants are for their floral display.

In the arrangement of a Fernery the usefulness of these colourings is obvious, and the advantages to be derived from the use of such plants for that purpose are so manifest as to scarcely require any illustration. When formed into groups exclusively by themselves, or when disposed among other Ferns lacking bright colours, the kinds with tinted fronds are truly beautiful, and greatly add to the appearance and general effect of the stove or greenhouse in which they are grown—for it may be stated here that kinds of Ferns with coloured fronds are adapted equally for warm or for cool cultivation. The brightest hues are, it is true, found among plants requiring the temperature of the warm-house, where a greater amount of heat and a comparatively greater quantity of moisture appear to favour the production of bright colours in Ferns, as they do in the case of other plants with decorative foliage. The Ferns belonging to this section are also found among the large-growing kinds as well as among those of smaller dimensions, thus giving their cultivator free scope for placing them in all parts of the house in which they are grown.

Among the large-growing kinds, and next to the popular *Blechnum braziliense*, *Didymochlæna lunulata* (*truncatula*) occupies a most prominent position, as its very handsome and regular habit, the beautiful bronzy tint of its young foliage, and the dark shining green colour of the older fronds, have made it a general favourite wherever it has been introduced. This applies with equal force to the magnificent *Davallia divaricata* (*polyantha*), a species producing immense fronds of a particularly graceful arching character and coriaceous nature, which, before they assume the dark, glossy green colour peculiar to them, pass through a whole series of tints and shades, varying from deep purple to bright magenta, then to light bronze. All these transformations take place in the course of a few days; and the plant being evergreen, and growing all the year round, some of these richly-coloured fronds are found on it at almost any time of the year.

We have a little group composed of several strong-growing Japanese Nephrodiums, whose foliage bears lovely metallic tints: *N. erythrosorum*, of large and handsome proportions, producing in great abundance its highly decorative fronds, which are rendered exceedingly interesting by the sori being large, and the indusium which covers them being of a bright, light red colour, contrasting most pleasantly with the dark glossy green hue of the upper surface of the mature frond and the light pinkish colour of the partly-developed ones; *N. opacum*, whose fronds, of a particularly leathery nature, possess very lasting properties; and the charming *N. prolificum*, having all the appearance of a finely-cut form of *N. erythrosorum* as regards mode of growth and the glorious tints of its elegant fronds, which are, besides, very singular, as when mature they are covered with young plants produced as plentifully as on the well-known *Asplenium bulbiferum*. *Aspidium* (*Nephrodium*) *varium*, a species seldom seen in cultivation, is remarkable for the rich, glowing, velvety-metallic colour of its young fronds, which later on assume a splendid dark green tint. To the above-enumerated species we must add, though representing different tints, it is true, but quite as attractive in their way, the popular and vigorous *Polypodium aureum*, and the scarcer and still more distinct *P. a. areolatum* (*sporadocarpum*): both are strong growers, and produce a charming effect in the Fernery, where the bold and massive foliage of the former, of quite a bluish tint, forms a singular contrast with the colour of other Ferns around it. The latter, although of a somewhat more rigid habit, is nevertheless one of the handsomest coloured Ferns in cultivation, and always commands attention on account of its erect, deeply-pinnatifid, slightly-waved, and very glaucous fronds.

The genus *Adiantum* is undoubtedly the richest in species with tinted fronds, and, as regards brightness of colours and variety of forms, it surpasses all other genera. Although small-growing kinds certainly predominate among coloured Maidenhairs, several strong growers are to be noted among them, particularly the gigantic *A. polyphyllum* (*cardiochlæna*), whose handsome fronds, averaging between 4ft. and 5ft in height when fully developed, are of a pale green when mature, but of a truly beautiful semi-transparent rosy colour in their young stage. The foliage of the strong-growing *A. trapeziforme* is of a uniform green colour, but some lovely pink, red, and bronzy tints are to be noticed among its varieties *cultratum*, *Sanctæ-Catharinæ*, and *pentadactylon*, all of which attain equally large dimensions. These colours are also characteristic of the elegantly-pendulous *A. peruvianum*, and of the more rigid *A. Seemannii*, both of which have broad pinnules of a delightful metallic hue when in a young state. Again, the bright red colour of the young growth of *A. Veitchianum* and *A. cyclosorum* is intense, especially when these species happen to be grown in close proximity to the glass, and in a genial temperature, with a good deal of atmospheric moisture surrounding them. For colours and elegance none of the above-mentioned species, however, can compete with that Queen of the Maidenhairs, *A. tenerum Farleyense.* Where is there any other foliage plant approaching the subtle and delightful tints found in a well-grown plant of that deservedly-popular variety? When it has been kept near the light, in a temperature varying from 65deg. to 75deg., and enjoying an abundance of moisture, its broad, elegantly-fringed pinnules, instead of having the sickly, yellowish appearance which is so detrimental to the well-being of the plant, are of a pale but bright green colour relieved by a wonderfully pretty purplish border, which greatly adds to the numerous charms of the Fern. Quite as attractive as most of the foregoing, although lacking the bright colours of many of them, is the beautiful *A. Williamsii*, most distinct and conspicuous above all others by the pale green, almost yellow, tint of its long, hanging fronds; when young, these are covered with a bright yellow powder, which gradually disappears as the fronds reach maturity. Being of a somewhat straggling habit, this species, like many other Ferns, is scarcely adapted for pot-culture; the plants, however graceful they may be in themselves, do not show to the best advantage when grown without due regard to their requirements. The best, and we should say the most natural, way of cultivating this striking species is that adopted at Kew, where fine specimens of it, grown in suspended baskets, are the admiration of every beholder.

If we now turn from the strong-growing Adiantums to the smaller kinds belonging to the same genus, we find among these some interesting and striking species, both in colour and habit. Most captivating indeed are the extraordinary tints of some, such as the charming little *A. rubellum*, with sub-erect fronds, varying in colour from the yellowish-pink which the plants assume when they don their spring foliage, to the magenta, and then the bright purple border peculiar to their further development; while the bright carmine of *A. macrophyllum*, with large pinnæ of a singular shape, and the brilliant rose, turning later on to a beautiful copper-colour, of *A. tetraphyllum gracile* and *A. t. Hendersoni*, are scarcely equalled in any other plants. In the case of *A. cuneatum gracillimum* and *A. c. Legrandi*, two varieties which, among dwarf-growing kinds, can hardly be surpassed for gracefulness, the young fronds, naturally light and feathery, assume, when grown near the light, an intense rosy-pink colour, which they retain for a very long time. The long-fronded, pendulous *A. concinnum*, the erect little *A. tinctum*, and the exceedingly interesting little *A. cuneatum Luddemannianum*, are also found among the gems of a good collection: the last is specially attractive, with its agglomerated pinnules, forming little rosettes, which, when the plant is grown near the light, not only exhibit various shades of green, but during the spring and summer are further ornamented by a very pretty pale magenta edge.

Among other genera we find, in kinds of dwarf stature, with fronds of red and metallic colours, the charming little *Doodia media*, *D. aspera* and its crested form *multifida*; the now very rare *Lomaria l'Herminieri*, a species of compact and sturdy habit, whose short, coriaceous fronds are produced in abundance all through the summer; also the charming *Polypodium appendiculatum*, whose arching fronds are ornamented with a network of rich crimson, entirely covering them during their young state; the pretty little *Blechnum Lanceola*, *Osmunda regalis* (*palustris*), *O. r.* (*japonica*) *corymbifera*, and many other kinds of minor importance.

The glaucous or bluish tints, which so effectively relieve the monotony of a uniform mass of green foliage, and which, as has been stated above, are well represented among strong-growing kinds by *Polypodium aureum* and *P. a. areolatum* (*sporadocarpum*), are shared particularly by some of the dwarf Pellæas: these form in themselves a most interesting group, and, being evergreen, are well adapted for the ornamentation of our warm and cool Ferneries all the year round. It is really very difficult to state which of these plants are most effective, as the same refreshing tints which characterise the genus *Pellæa* are shared to a great extent by nearly all the kinds comprised in it. *P. andromedæfolia*, *P. atropurpurea*, *P. Bridgesii*, *P. ornithopus*, and *P. o. brachyptera*, are little gems among glaucous Ferns; but the most distinct in form are *P. ternifolia*, *P. cordata*, and *P. c. flexuosa*. The last has gracefully-pendulous fronds, which show themselves to perfection when the plant is grown in a suspended basket, and near the light. *P. ternifolia* requires to be grown in the same way to show to the best advantage its prettily-coloured fronds, which are rendered still more striking by their curious and uncommon shape, the pinnæ being disposed in whorls, forming little stellate clusters of pale blue foliage, set at equal intervals all along a black stem, which is no stouter than, and as shining as, that of an Adiantum. *P. cordata* is now a very scarce species, whose fronds, averaging 1½ft. long when fully developed, stand nearly erect, thus showing to perfection the heart-shaped pinnæ, which are of a most pleasing outline, while their natural glaucous colour is all the more showy on account of the stripes being straw-coloured.

Even the genus *Selaginella* supplies us with several subjects particularly attractive on account of their bright colours. Nothing is more gorgeous than the lovely peacock-blue tint of the foliage of the common drooping *S. uncinata* (popularly known as *S. cæsia*), which is very extensively used for planting in hanging baskets for cool- and warm-houses alike. The same beautiful colour is equally peculiar to *S. Willdenovii*, a species of upright scandent habit which, in commerce, has from time immemorial been known, though, as it would appear, erroneously, under the names of *S. lævigata* and *S. cæsia arborea*. The bronzy, erect-growing *S. atroviridis* and the metallic *S. Vogelii* (*africana*) and *S. rubella* deserve special notice, as well as the bright golden form (*aurea*) of the dwarf, creeping *S. Kraussiana* (or, as it is more commonly called, *S. denticulata*), which is extensively used for covering the ground in Ferneries, where it grows luxuriantly under the friendly shelter of the Ferns. These dwarf-growing Selaginellas are frequently seen grown in a sort of pyramid or mound, under which conditions they are very effective; but they may also, and with great advantage, be planted in the Fernery, where they will spread rapidly. It is worthy of remark that the bluish and metallic tints of *S. uncinata* (*cæsia*) and *S. Willdenovii* (*cæsia arborea*), instead of being, as is generally supposed, intensified by exposure to strong light, are usually destroyed by it, as its action has a tendency to turn the peacock-blue tint of the fronds into a shabby reddish colour. The golden- and silver-variegated forms of *S. Kraussiana* (*denticulata*) are the only kinds which really derive benefit from exposure to light, without which they scarcely show their distinctive characters.

Although not exhaustive, the following is a representative list of Ferns with coloured and tinted fronds. Only the kinds marked with an asterisk (*) require stove temperature; all others thrive under greenhouse treatment. For stove and greenhouse temperatures, see page 27.

- Adiantum aneitense.*
  - caudatum Edgeworthii.*
  - colpodes.
  - concinnum.*
  - c. Flemingi.
  - c. latum.*
  - cuneatum gracillimum.
  - c. Legrandi.
  - c. Luddemannianum.
  - curvatum braziliense.*
  - cyclosorum.
  - fulvum.
  - Ghiesbreghti (scutum).*
  - hispidulum (pubescens).
  - intermedium.*
  - lunulatum.*
  - macrophyllum.*
  - m. bipinnatum.*
  - monochlamys.
  - peruvianum.*
  - polyphyllum (cardiochlæna).*
  - pulverulentum.*
  - rhodophyllum.*
- Adiantum rubellum.
  - Seemannii.*
  - tenerum Farleyense.*
  - tetraphyllum gracile.*
  - t. Hendersoni.*
  - tinctum.
  - trapeziforme cultratum.*
  - t. pentadactylon.*
  - t. Sanctæ-Catharinæ.*
  - Veitchianum.
  - Victoriæ.*
  - Wagneri (decorum).
  - Williamsii.
- Aspidium (Nephrodium) varium.
- Blechnum braziliense.
  - Lanceola.
  - L. trifoliatum.
  - longifolium.
  - l. gracile.
  - occidentale.
- Brainea insignis.
- Davallia divaricata.*
  - heterophylla.*

- Davallia immersa.
    - pallida (Mooreana).*
    - retusa.*
    - tenuifolia Veitchiana.*
- Didymochlæna lunulata (truncatula).*
- Doodia aspera.
    - a. multifida.
    - blechnoides.
    - caudata.
    - media.
- Lomaria attenuata.
    - L'Herminieri.*
    - Patersoni.
- Nephrodium erythrosorum.
    - odoratum.
    - opacum.
    - prolificum.
    - Sieboldii.
- Osmunda regalis (japonica) corymbifera.
    - r. palustris.
- Pellæa andromedæfolia.
    - atropurpurea.
- Pellæa Breweri.
    - Bridgesii.
    - cordata.
    - c. flexuosa.
    - mucronata (Wrightiana).
    - ornithopus.
    - o. brachyptera.
    - ternifolia.
- Polypodium appendiculatum.*
    - aureum.
    - a. areolatum (sporadocarpum).
    - glaucophyllum.*
- Pteris incisa.
    - quadriaurita aspericaulis.
- Selaginella atroviridis.*
    - Kraussiana aurea.
    - rubella.*
    - uncinata (cæsia).
    - Vogelii (africana).
    - Willdenovii (cæsia arborea).*
- Woodsia polystichoides Veitchi.
- Woodwardia orientalis.

CHAPTER VII.

VARIEGATED AND CRESTED FERNS.

IF we consider the many crested, variegated, congested, truncate, depauperated, revolute, cornute, marginate, and other forms found in many genera, we feel bound to acknowledge that there is little, if any, doubt that Ferns are as much addicted to variation as any other members of the Vegetable Kingdom. The creation of new species, especially amongst Ferns, is mostly the result of a slow process of evolution by which Nature produces new types inheriting more or less of the parental characters. To these same variations, or freaks of Nature, we are indebted for the majority of our decorative trees and shrubs, as also for a goodly number of our flowering and foliage plants of an herbaceous nature.

Variegated Ferns and Selaginellas.

The most striking of the several variations which naturally affect Ferns are "cristation" and variegation; and it is noteworthy that this latter form of variation appears to be almost exclusively peculiar to Ferns of exotic origin, and even these are anything but numerous, as they only form a group, which, even including the variegated Selaginellas, numbers barely a score of species and varieties. Some of these, such as *Anemia Phyllitidis tessellata* and *Gymnogramme japonica variegata*, can hardly be said to possess the variegated character in a permanent way, for although, when freshly developed, their fronds show unmistakable signs of variegation, these gradually disappear as maturity is attained. It is somewhat singular that Nature, although so prolific in the production of variegated forms of trees, shrubs, and herbaceous plants in Europe, should act so very sparingly with regard to Ferns as to leave positively no record of regularly-variegated species and varieties permanently maintaining that character. Mention has occasionally been made, it is true, of variegated forms of *Nephrodium Filix-mas*, of *Aspidium angulare*, and of *Scolopendrium vulgare*, but none of these have proved constant under cultivation; neither in these cases is the variegation anything particularly striking, nor does it increase the decorative value of the plants affected by it.

Among exotic Ferns accidental variegation is also occasionally met with, especially in such genera as *Lomaria* and *Nephrolepis*, in which portions of fronds are more or less splashed with white or yellow; but, notwithstanding unremitting efforts on the part of specialists to fix these variations, none of them have proved constant. An illustration of the deep interest with which growers regard the fixing of variegation in certain genera may be given here, in connection with the production of a singular form of *Adiantum decorum*, which originated in Mr. Herbst's nurseries at Richmond, Surrey, in 1874 or 1875. The peculiarity of that plant, which had retained the habit and the general characters of the species, consisted in the colouring of the pinnules, most of which in the mature fronds were of a dark green, freely striped with a much lighter colour. This Fern was the object of so much consideration and attention on the part of its owner, that for several years numberless seedlings were raised and grown by him to a size quite sufficient to enable him to ascertain their value; but, although the variegated character was shared by most of the seedlings, none of these showed it to a degree sufficiently marked to allow of their being distributed as truly variegated plants. Again, in 1871, one really well-variegated form of *Adiantum cuneatum* made its appearance among the thousands of seedlings annually raised in Messrs. Hugh Low and Co.'s nurseries at Clapton. In this case the variegation was exceptionally good, the very dark green colour peculiar to the mature fronds of the species being copiously relieved by pure white streaks, which extended to all parts of the little fronds. Unfortunately, that most interesting plant was, through sheer neglect, lost to science and to the floral decorator alike. Instead of being separated during the process of pricking off, three or four seedlings had, as is frequently the case, been allowed to remain together, and one day the plant with the variegated portion in it was found to have disappeared among a quantity of young *A. cuneatum*, which had been included in an order for Ferns intended for filling small glass vases for a living-room, where, no doubt, its doom was sealed, as nothing more was ever heard of it. This occurrence is all the more to be regretted as the reproduction of the plant would have been watched with the utmost interest. It is well known that in really well-variegated Ferns the character referred to is, with scarcely any exception, faithfully reproduced; and it is important to note that amongst exotic kinds the variegation, when fixed, is both constant and decorative.

In 1882 we met, in Belgium, with a very singular form of *Adiantum formosum*, whose fronds, about 2½ft. in height, and equal in vigour to those of the typical species, were densely furnished with innumerable small pinnules of a light green colour, but copiously dotted and splashed all over with pale yellow. The most admired, however, among these variegated Maidenhairs, is undoubtedly an extremely pretty form (*striatum*) of *A. macrophyllum*, which seems to have made its appearance simultaneously in England, in France, and in Belgium, in 1883—an occurrence which can scarcely be accounted for in any way. In each case the variegated plant has preserved the erect, somewhat rigid habit of the typical species, and the fronds, rising from an underground, creeping rhizome, attain from 1ft. to 1½ft. in height. Their large and peculiarly-shaped pinnæ are, like those of the type, of a delicate pink or red colour when young; but this ground-tint is very freely relieved by yellow stripes, which, besides being the principal ornament of the partially-developed fronds, remain perfectly distinct and prominent when the foliage has assumed its permanent bright green colour.

Interesting as the above-mentioned representatives of the genus *Adiantum* may be, as illustrating the natural variation in the direction of variegated Ferns, they are greatly surpassed in that way by the various kinds of *Pteris*, forming part of a genus which undoubtedly is the richest among Ferns in subjects partaking of that character. Of these, too, some of the East Indian species require warm-house treatment, whereas others are perfectly satisfied with a cool-house temperature. Among the latter, *P. cretica albo-lineata* may reasonably claim to be the most distinct and useful of variegated Ferns, and the appreciation of its decorative qualities is sufficiently shown by the enormous quantities of it which, every year, and in all sizes, pass through our London markets. The beauty of its variegation and the hardiness of the plant are, no doubt, the characters which have secured a well-deserved popularity for this Fern. It is particularly well adapted for the decoration of the dwelling-room, where, provided it receive careful treatment, it will remain for a long time in perfect health, the broad silver bands which occupy the centre of its fronds, and the bright green colour peculiar to their edges, being extremely attractive. A thoroughly distinctive character of this species lies in the great dissimilarity of its barren and fertile fronds: the former, forming the body of the plant, are broad, and of a somewhat spreading habit, while the latter, much narrower in all their parts, are erect and well above the others, thus giving the plant a highly ornamental appearance. We have in the home-raised variety *Mayi* a crested form of *P. cretica*, in which the dissimilarity of fronds, as a distinctive character, has not been reproduced. Although in this case the variegation is of equal brilliancy, the fronds are nearly all uniform in size, and, instead of standing in an erect position, all the fertile ones partake more or less of the decumbent or spreading character which, in the typical plant, is peculiar to the barren fronds, forming a plant of compact growth and habit similar to the several known crested, but green, forms of this essentially decorative Fern.

Again, there is the beautifully-coloured *Pteris biaurita nemoralis variegata*, whose fronds attain large dimensions, and are rendered highly attractive by the centre of each pinna being of a bright pinkish colour, gradually, however, fading into white, a tint which it retains as long as the fronds remain on the plant. Somewhat in the same way, but with foliage adorned with colours of extreme brilliancy, is *P. quadriaurita tricolor*, an East Indian variety somewhat difficult to manage. It is only now and then that we hear of someone having succeeded in growing it to perfection, and in most cases this happens seemingly without anything special in the way of cultivation: its well-being evidently depends more on local or climatic influences than on skilful treatment. As a proof of this, it may be stated that in some places, where formerly this lovely Fern was thriving, it will now hardly grow, in spite of unchanged treatment; whereas, in other places, where for years it only contrived to exist, it occasionally makes a sudden burst and for a certain time grows apace. One practically successful instance came under our notice in 1867, when, to our great astonishment, we saw, at Loisy, near Vitry-le-Français, in the east of France, planted in a camellia-bed, in the greenhouse, two magnificent self-sown specimens of this beautiful Fern, with fronds fully 2½ft. long, having the centre of each pinna, throughout the whole plant, of a bright rosy-red, with a margin of white on either side of it, which colours formed the most pleasing contrast with the rich, glossy green of the other portions of the fronds. These two subjects must, however, have been endowed with a special and particularly robust constitution, since hundreds of seedlings, pricked off from the same batch of prothalli to which the two plants referred to belonged, were grown, some on shelves, close to the glass, in the warm-house, and others on the same camellia-bed, but with altogether different results: none of these ever succeeded in getting over the stunted stage in which this eminently distinct Fern is generally seen.

Very different, in point of culture, from *Pteris quadriaurita tricolor* is the popular and robust-growing *P. q. argyræa*, with its gracefully-arching fronds, which, under liberal treatment, often attain a length exceeding 4ft. It is, to say the least, very singular that, like the preceding variety, this, which may justly be considered the best representative of variegation in Ferns, should have been introduced about the same time accidentally, both having been found spontaneously, the former in Belgium, the latter in England, among some soil in which other plants had been packed and imported from abroad. *P. q. argyræa*, however, is by far the more useful of the two, and is particularly well adapted for pot-culture for decoration. On account of its remarkably well-defined and striking variegation, it is most effective, as the large band of silvery-white in the centre of its fronds and pinnæ forms a most pleasing contrast with the lively green by which it is surrounded in every part of the plant. Although recommended for growing in a cool-house, where it thrives very well during the summer, this useful species evidently requires a higher temperature during the winter, its dislike to cold being clearly indicated by the brownish colour which its fronds, even when mature, assume under cool treatment in the winter.

Pteris palmata nobilis (or *Doryopteris nobilis*, as it is more commonly called), is another variegated Fern requiring stove temperature. So far as general appearance is concerned, this is totally different from all other Pteris, as its fronds, instead of being once or several times divided, are, when in a young state, first heart-shaped, then of a broad sagittate form; but as the plant becomes stronger, they assume a more palmate shape. They are bright

green in colour, and their broad, slightly-undulated segments are ornamented throughout with a broad, white band, which gradually diminishes in intensity as it approaches the edges.

In June, 1877, Messrs. James Veitch and Sons exhibited, at a meeting of the Royal Botanic Society, an exceedingly pretty variegated Fern, under the name of *Pteris ensiformis variegata*, which was then certificated. Its little fronds, the longest of which were barely 8in. long, were particularly attractive on account of the brightness of their silver markings. The variegation, which equally affected the lateral pinnæ, was particularly noticeable on the terminal one; this, compared with that of most other Pteris, as also with the size of the plant, was very long. The partial extinction of this particularly neat little Fern is a matter for regret, as it was thoroughly distinct from all other known kinds. It is equally surprising as it must have been of easy reproduction, the plants shown on the occasion referred to having been raised in England from spores received from India, thus showing that, like all other well-variegated Ferns, this had the power of reproducing itself true from seedlings.

There are a few other variegated Ferns which do not belong to either *Adiantum* or *Pteris*, and which only require cool-house treatment. Among these the most beautiful is assuredly *Asplenium macrocarpum* (*Goringianum*) *pictum*, a very handsome Japanese kind, of medium size. Its fronds are abundantly produced from a fleshy, underground rhizome; they are very graceful (but, unfortunately, also very brittle), and particularly striking on account of their pretty claret-coloured rachis, on each side of which are the pinnæ variegated with white, and furnished throughout with a central whitish band; as the fronds get matured, the band assumes a greyish hue, very distinct from the dark ground surrounding it.

A most valuable addition to the group of variegated Ferns that are nearly hardy and of robust constitution, is found in *Nephrodium Otaria* (*aristatum*) *variegatum*, a Japanese species. Its variegation, which is very good and clear, is a light yellowish-green on a dark shining ground. Its constitution and the nature of its fronds render it one of the most enduring of all cool Ferns.

There are two species in which the foliage, if not strictly variegated, is spotted with white. The more interesting of these is *Gymnogramme Muelleri*, an Australian species bearing no outward resemblance to any other Gymnogrammes, but appearing to be more closely allied to *Asplenium Ceterach.* Its pinnate fronds are stiff and furnished with roundish pinnæ, the under side of which is densely clothed with brown scales, whereas the upper surface, which is of a bright green, is dotted all over with scales of a brilliant silvery nature, producing a pleasing effect, and simulating a sort of regular and perfectly constant variegation, entirely distinct from that of any other Fern. The other is *Nephrodium albo-punctatum*, a plant of medium growth, whose dark and leathery foliage is freely dotted with white.

On account of their affinity, we shall, to complete this section, include several variegated forms of Selaginellas, the most popular, the most useful, and the best-known of which is *S. Martensii variegata.* This variety has kept the habit and vigour of the sub-erect growing type, although the broad, dark leaves, clothing the numerous stems—which, on their under-side, produce a great quantity of roots—are profusely blotched with white. The latter characteristic, although not quite constant, is reproduced by means of cuttings. *S. Kraussiana variegata* (or, as it is more commonly but erroneously named, *S. denticulata variegata*) is a variety of the species so extensively used for edgings, and for covering the surface of the pots of plants kept in the dwelling-room. It is not, however, adapted to the latter purpose, but is found exceedingly useful for edgings, for pot-culture, or for planting in rockeries ; in all of which positions its minute and dense foliage, beautifully tipped with white, is most effective. This interesting little plant requires, during the winter, to be kept close to the light, in order to prevent its damping off. The last and most distinct variegated Selaginella is a form of *S. involvens*, which belongs to the "tabuliform" section of the Club Mosses. It forms a pretty, dwarf tuft, consisting of an overlapping series of branches disposed round a central axis, and furnished with innumerable small branchlets ; some of the branchlets are creamy-white, and these, being abundantly produced and being mixed with the green foliage, make it an elegantly-variegated plant.

In the appended list of variegated Ferns, the species and varieties marked with an asterisk (*) are hardy ; those marked with a dagger (†) require stove temperature all the year round ; while those which are not specially marked thrive under common greenhouse treatment. For the stove and greenhouse temperatures, see page 27.

- Adiantum formosum variegatum.
  - macrophyllum striatum.†
- Anemia Phyllitidis tessellata.
- Aspidium aculeatum angulare variegatum.*
- Asplenium Adiantum-nigrum variegatum.*
  - fontanum variegatum.*
  - macrocarpum (Goringianum) pictum.
- Gymnogramme japonica variegata.
  - Muelleri.
- Nephrodium albo-punctatum.
  - Filix-mas variegatum.
  - Otaria (aristatum) variegatum.
- Polypodium vulgare variegatum.*
- Pteris aquilina variegata.*
  - biaurita nemoralis variegata.
  - cretica albo-lineata.
  - c. Mayi.
  - ensiformis variegata.
  - palmata nobilis.†
  - quadriaurita argyræa.
  - q. tricolor.†
- Scolopendrium vulgare variegatum.*
- Selaginella involvens (japonica) variegata.
  - Kraussiana (denticulata) variegata.
  - Martensii variegata.

Crested Ferns.

It has been clearly demonstrated that variegation is a form of variation possessed almost exclusively by Ferns of exotic origin. Cristation, on the contrary, is a form of variation to which European Ferns appear much more predisposed than exotic kinds, for there is scarcely a British species which has not produced crested forms, from the dwarf *Asplenium Trichomanes* to the gigantic-growing *Pteris aquilina*, or common Bracken.

In exotic, as in native, species of Ferns, cristation consists in the subdivision—in some instances many times repeated—of the extremities of the fronds, by which process a sort of tassel is naturally formed. At other times the cristation is only shown by the bifurcation of the tips of the fronds; but it is interesting to note that, whatever form this character assumes, it generally extends to the pinnæ, which are usually affected in the same manner, though in a lesser degree, as the extremity of the frond itself. Another point which is worth noticing, is that the stalk of the frond is seldom, if ever, affected by simple cristation. The abnormal character of the stalks, which occasionally become fasciated or flattened, and branched out, is only shown when cristation, by infinite division of all parts, is developed to such an extent as to produce, instead of a flat, normal frond, either a ball-like mass of green vegetation, or an intricate and symmetrically-divided sort of lattice-work.

Cristation—"monstrosity," as it has sometimes been called—is, when shared by exotic kinds, in the majority of cases constant, as plants partaking of it reproduce themselves freely from spores with very little variation. Such, however, is not the case with British Ferns, as many of them have a tendency to revert to the common or typical form when some peculiarities in their treatment do not agree with them. It is also well known that not only do some of these crested forms revert to the type, but the offspring of these are in many cases extremely variable. Such inconstancy plays an important part in the production of new varieties, as it is now an accepted theory that when the common form has once varied, the produce of this variation have a greater tendency to vary again. In the case of the propagation of a specially-fine crested form being required, this can only be effected with security by the division of the original plant.

The variation by way of seedlings in connection with crested Ferns is of such importance that we trust it will not be considered out of place here if we quote Mr. Druery's experience on its reproduction. Speaking on this most interesting subject, Mr. Druery, in a most elaborate article on variation in his excellent work on "Choice British Ferns,"* says: "We have ourselves raised a very robust and heavily-crested form of Hard Fern (*Lomaria Spicant*) from a wild find of similar character, but of smaller growth. Strange to say, the sowing from which this splendid plant originated was so nearly a failure that only the one plant resulted, which, as stated, surpasses the parent; yet when spores of this more marked variety were sown, fully 90 per cent. were absolutely common Hard Ferns; two only closely resembled the parent, one far surpassed it, several are of a different type of cresting; one is extremely dwarf, with fronds absolutely fan-shaped—and between these and the common ones there is every grade of cresting, from merely squarish tips to ball-like tufts."

The foregoing statement, emanating as it does from such a high authority on the subject, and being the result of a series of careful experiments, conducted with a view to ascertaining the constancy of seedlings, will, we venture to say, prove conclusive as to the amount of reliance to be placed on the reproduction of crested variations by their own spores. But these remarks apply exclusively to British Ferns. The reproduction of crested exotic kinds is principally effected by seedlings, and, generally speaking, with most satisfactory results. The numerous crested forms of *Pteris*, *Gymnogramme*, *Adiantum*, *Nephrodium*, &c., are illustrative of our theory. For instance, in the case of seedlings of *Adiantum cuneatum grandiceps*, the first plant of which originated in England about 1878, there never is any variation; thousands upon thousands of young plants of this crested variety are raised yearly, and all partake to about the same extent of the characters of the first accidental seedling. *Pteris cretica Mayi*, also a home-raised crested form, follows the same rule, and yields nothing but true representatives of the plant originally raised at Edmonton about 1884. The same may be said of the beautiful *P. cretica nobilis*, and of several forms of *P. serrulata cristata* which have become fixed, and which are, as a rule, reproduced without any striking variations. Exception must, however, be made in favour of the splendidly-crested form of *P. serrulata* known as the Chiswick variety. This is the strongest-growing of all home-raised forms of the Ribbon Fern, but up to this time it has not proved amenable to propagation by means of spores; these are yielded abundantly, but have rarely, if ever, been known to reproduce plants partaking of the same robust characters as the one originally raised in the gardens of the Royal Horticultural Society, at Chiswick, about 1867.

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* "Choice British Ferns: their Varieties and Culture." By Charles T. Druery, F.L.S. London: L. Upcott Gill, 170, Strand, W.C.

The above remarks bear exclusively upon the reproduction of crested exotic Ferns which have been artificially or accidentally produced under cultivation in Europe. Crested exotic Ferns found in their native habitats are comparatively few in number, and it is that scarcity of spontaneous production which prompts us to say that European species have a much greater tendency to cristation than exotic kinds. Indeed, should the latter be addicted to the same variations, it would be most difficult to explain how the collectors have not ere this discovered and sent home crested Ferns in quantities: as a matter of fact, these same sorts, spontaneously produced in their various native habitats, may almost be counted upon the fingers.

We have amongst the first exotic crested Ferns introduced, the remarkably handsome *Nephrolepis davallioides furcans*, a plant which, as a decorative subject, can hardly be surpassed. This useful and interesting variety reproduces itself fairly well from seedlings, although a few of these give variations or forms which are crested in the same manner as the parent, but with pinnæ a trifle narrower and more denticulate than those of the original; in any case these occasional variations are not of sufficient importance to allow even for varietal names. As a plant of similarly strong habit, and whose cristation is both ornamental and distinct, *Davallia* (*Microlepia*) *hirta cristata* may be considered a natural companion to the above-named Nephrolepis. Its robust growth makes it valuable to the amateur; its long, massive, beautifully-arching, heavily-tasselled fronds render it one of the best Ferns for the decorator; while its easy mode of reproduction, true from spores, enables the market grower to produce in enormous quantities a plant for which he finds a ready sale.

Among smaller-growing kinds of exotic Ferns introduced into Europe in crested forms, we may note *Osmunda regalis japonica corymbifera* and *Davallia Mariesii cristata;* both of these are of Japanese origin, and their introduction into Europe dates from about 1880. In both instances the seedlings reproduce exactly the typical crested plants. The propagation of *Osmunda regalis japonica corymbifera*, which, through its dwarf and compact habit, is unquestionably the best of all the known forms of the Royal Fern for decorative purposes, and especially for pot-culture, would be particularly slow were it not that the spores, which are very sparingly produced, germinate freely, and until now have not been known to yield any variations. From the information supplied by the collector who introduced it from Japan, where he remained several years, it is positively certain that, although the plain *O. regalis japonica* is very prolific there, the crested form, in its native habitat, has never been seen in fructification. The same character of sterility was equally observed during the four years following its introduction into Europe, after which time first a very small portion of frond, then part of another, became, as it would appear, accidentally fertile. The spores then gathered were sown, and in due course a progeny of young plants, resembling the parent in all respects, were produced. Although five years have elapsed, and the plant that yielded the spores from which the first crop of European seedlings originated has greatly increased in size, and has been very carefully watched year after year, there has been no other sign of fructification; but, on the other hand, several plants of the younger generation have produced fertile fronds, and those again have yielded innumerable young subjects, partaking of the same characters as the original parent.

In the case of *Davallia Mariesii cristata*, there would be no real necessity for depending on the reproduction of the crested character by the seedling process, as the plant is provided with numerous slender rhizomes, by means of which it could be propagated in any quantity. Still, with a view to ascertaining to what extent this naturally-crested exotic Fern would reproduce itself, several sowings from spores gathered on well-crested fronds were made during two successive seasons, and the results perfectly justified the assertion made that it is self-reproducing, for among the thousands of young plants obtained from these several batches of seedlings, no variation of any importance was observable.

The dwarf crested form of *Doodia aspera*, called *multifida*, is another striking instance of constancy of reproduction in this section of Ferns, for the pretty tasselled character of its short, hard fronds, and their peculiar bronzy-red tint, are characters which in every instance are reproduced true among seedlings raised from spores gathered from the crested plants. Crested forms of *Nephrodium molle* are of garden origin, and they reproduce themselves freely from seedlings; while the New Caledonian crested form of *N. Richardsi*, called *multifidum*, was, about 1878, introduced into Europe, where it was rapidly propagated by means of its own spores. In the latter case the seedlings are found to have a tendency to variation, but in that respect they only share the character of their parent, which is extremely variable, the fronds on the same plant being sometimes heavily crested, and at other times simply forked. It follows that even in this instance the report of thorough reproduction of the parental characters in exotic crested Ferns is perfectly in accordance with the theory expounded above, but which does not refer to British Ferns.

On account of the elegance given to the fronds of most of the crested varieties by the weight of their terminal tassels, the majority of these are well adapted for growing in suspended baskets, in which position they prove eminently decorative. We therefore append a list of most of the known exotic crested kinds, either of garden origin or introduced in already crested form. As regards British Ferns, however, the variations in forms of such species as *Asplenium Filix-fœmina*, *Nephrodium Filix-mas*, *Aspidium aculeatum angulare*, and *Scolopendrium vulgare*, are so numerous that their complete description in this part of the book would be justly considered out of place, and we feel compelled to limit ourselves to simply indicating their existence in the following list, reserving such descriptions till later on, when each genus will be treated separately and in detail. In this list the species and varieties marked with an asterisk (*) are hardy; those marked with a dagger (†) require stove temperature all the year round; while those which are not specially marked thrive under common greenhouse treatment. For stove and greenhouse temperatures, see page 27.

Adiantum æthiopicum assimile cristatum.
  cuneatum grandiceps.
  c. Luddemannianum.
  excisum multifidum.
  schizophyllum.
  versaillense.
Aspidium aculeatum acrocladon.*
  a. angulare, numerous varieties.*
  a. cristato-gracile.*
Asplenium Adiantum-nigrum grandiceps.*
  Filix-fœmina, numerous varieties.*
  marinum ramosum.*
  Ruta-muraria cristatum.*
  Trichomanes cristatum.*
  T. multifidum.*
  T. ramosum.*
  viride multifidum.*
Davallia elegans polydactyla.†
  (Microlepia) hirta cristata.†
  Mariesii cristata.
Doodia aspera multifida.
Gymnogramme calomelanos chrysophylla grandiceps.†
  c. c. Parsonsi.†
  pulchella Wettenhalliana.†
Lomaria gibba Belli.
  Spicant cristatum.*
  S. multifurcatum.*
  S. polydactylon.*
  S. ramosum.*
  S. trinervo-coronans.*
Nephrodium æmulum cristatum.*
  Filix-mas, numerous varieties.*
  molle corymbiferum.
  m. grandiceps.
Nephrodium patens cristatum.
  Richardsi multifidum.†
  setigerum (tenericaule) cristatum.
  spinulosum (dilatatum) cristato-gracile.*
  s. grandiceps.*
  s. polydactyla.*
Nephrolepis davallioides furcans.†
  Duffi.†
Osmunda regalis japonica corymbifera.
  r. cristata.*
Polypodium Lingua corymbiferum.
  vulgare bifidum.*
  v. compositum.*
  v. cristatum.*
  v. multifido-cristatum.*
  v. ramosum.*
Pteris aquilina cristata.*
  a. grandiceps.*
  a. multifida.*
  cretica Mayi.
  c. nobilis.
  serrulata angustata.
  s. Applebyana.
  s. corymbifera.
  s. cristata.
  s. c. compacta.
  s. c. Dixoniana.
  s. c. major (Chiswick variety).
  s. c. semi-fastigiata.
  s. polydactyla.
  tremula grandiceps.
Scolopendrium vulgare, numerous varieties.*
Woodwardia radicans cristata.

CHAPTER VIII.

GOLD AND SILVER FERNS.

THESE form a most interesting section, which is composed exclusively of plants of exotic origin. All of them possess a certain and constant charm even to the most uninitiated, who generally look upon them as marvels of creation. The gold or silver character of these Ferns is formed by different substances, and is due to various natural causes. In the majority of cases, such as in Gymnogrammes, in Adiantums, and in Nothochlænas, it is produced by a thick coating of fine powder forming a sticky substance, resembling a waxy exudation, with which the under side of the fronds is entirely and evenly covered; in other instances, such as in Cheilanthes, the under part of the fronds is rendered equally silvery by the superposition of scales or of hairs which uniformly cover their surface; while in the case of Silver Tree Ferns, and in some of the Gleichenias, the under side of the fronds, though deprived of either scales or real powder, is beautifully and evenly silvery, as if only painted white, or of a glaucous colour. But in their cases this white or glaucous colour is simply due to the presence of a substance of a consistency similar to that of the bloom on grapes and plums, and disposed in a coating so fine that it readily disappears when rubbed with the fingers. This substance, although quite superficial, is, however, laid very evenly, and forms, with the other portions of the leafy part of the fronds, a perfectly united body. A beautiful golden appearance is also frequently produced by the presence of spores, which, when disposed in sufficient quantities, give the fronds a brightness equal to that resulting from either of the above-named causes;

but although many kinds, especially amongst Polypodiums, are very prolific, none equal in brilliancy the beautiful *Onychium auratum*, which rightly deserves a prominent place among Golden Ferns. This really beautiful and robust-growing species, which thrives best in the warm-house with an abundance of moisture, is a native of the East Indies, where it is said to attain very large dimensions. It is a Pteris-habited Fern, with foliage extremely light and feathery, and there is no exaggeration in saying that when its robust, triangular, fertile fronds are fully developed and become mature, nothing, even among Gymnogrammes, can be more handsomely golden. These are all the more conspicuous in that they consist of linear segments, the upper surface of which is bright green, and contrasts pleasantly with the rich colour of their under side, adorned as it is by a massive indusium of a very bright yellow, which gives to the whole plant a pretty and interesting appearance.

Although the group under notice is a comparatively small one, it comprises representatives of several genera, among which the Gymnogrammes occupy the first and the largest place; and, as they are about the most variable of all the cultivated kinds of exotic Ferns, it follows that both the silver and the gold colours of the under side of their fronds, which form their principal attraction, vary greatly in intensity, as, out of a quantity of seedlings, varieties showing almost every shade of white, lemon, and golden-yellow powder may be obtained. They also vary as much as regards size as they do in colours, for whereas among the Golden section, the charming dwarf *G. sulphurea*, whose delicate fronds are covered on both surfaces with powder of a pale yellow colour, seldom exceeds 8in. in height, such varieties as *G. calomelanos chrysophylla*, *G. c. c. Martensi*, *G. c. c. Laucheana*, *G. c. c. gigantea*, &c., produce fronds which frequently attain 3ft. in length. Several other golden forms of *Gymnogramme*, of garden origin, distinct from one another, as also from the original species, in their habit, or in the colour of their powder, are equally strong growers. Among these the most distinct is, perhaps, *G. c. c. Alstoni*, which is a really handsome and attractive plant, and which, at the same time, may be regarded as one of the greatest curiosities in the whole Fern family. It is an excellent grower, of the *Laucheana* type, with broad, triangular fronds, supported on stalks of medium length, thus making a capital specimen. The

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character of curiosity is, however, imparted to it by the fact that, as the plant becomes adult, all, or at least the majority, of the pinnules completely turn back, their extremity being perfectly incurved; these, being of a bright golden-yellow colour, give a most peculiar, and certainly a very attractive, appearance to the plant, which then looks as if dotted all over with yellow beads, in some cases as large as good-sized peas. This curious variety also possesses the property of freely reproducing itself true from spores. Such are the variations in size and habit among the kinds forming the Golden section.

The plants belonging to the Silver section, although as a rule not such strong growers, are nevertheless very showy, and of a more uniform size; yet unless it happens to be under very special and favourable conditions *Gymnogramme calomelanos peruviana* remains comparatively low, and forms much more bushy plants than most other kinds: its fronds, in point of size, are equal to any of those belonging to the Golden section. Numerous intermediate forms are found between this excellent species (distinguishable at first sight from all others through its beautifully massive fronds, covered on both surfaces with a thick layer of powder as white as snow) and the dwarf-habited, though long-fronded, *G. tartarea.* Then we have the very long-fronded *G. calomelanos spectabilis*, showing a much more erect habit of growth, and attaining quite 4ft. in height.

G. trifoliata is a most interesting and very curious kind, differing from all other species, not only in its scandent habit, but also in the singular form of its fronds, which are linear and trifoliolate; these have also the power of extending to an almost indefinite length, and their under surface is covered in some instances with white, and in others with pale yellow, powder, rendered all the more apparent by the dark green colour of the upper surface of the pinnæ.

Among the plain-fronded Gymnogrammes there is one, named *G. decomposita*, which is very handsome, but somewhat difficult to classify, on account of the changeable colour of the farinose powder of its finely-divided, triangular fronds, which frequently reach quite 3ft. in length. While the plant is young, these are white, or nearly so; but the covering of the crown and stalks is of a yellow hue, which gradually deepens as the plant gets older. This species is also of a more erect and more decorative habit than most other kinds belonging to the genus, and its particularly finely-dissected appearance is produced by the numerous lobes of the pinnæ being deeply cut into minute segments. Other plain-fronded species, such as the delicate but exceedingly beautiful *G. Pearcei* and its superb variety *robusta*, *G. schizophylla* and its plumose form *gloriosa*, &c., have their foliage powdered with white only while young: as the plants get older, the powder becomes gradually scarcer, until in the adult stage it is limited to the crown itself.

As we have before remarked, cristation is a form of variation to which Gymnogrammes are very subject, for many of them have a tendency to produce forked and multifid fronds; but, contrary to most other crested Ferns, the Gymnogrammes thus affected have a more erect habit than the species with plain fronds. The differences in size are also less marked among the plants forming the crested section than in any other; the dwarfest form, however, is the thickly-crested *G. calomelanos chrysophylla Parsonsi*, whose short and sturdy fronds are entirely covered with a bright yellow powder. Then there are the handsome *G. pulchella Wettenhalliana*, whose fronds, which average about 20in. in length, are sometimes pure white, and in other instances pale lemon or sulphur-coloured; and the rare *G. calomelanos chrysophylla grandiceps*, with fronds averaging about the same size as those of *G. pulchella Wettenhalliana*, but in colour a very fine dark yellow, and with huge and massive crests, borne on erect stalks, which show themselves admirably amongst other kinds. These crested forms also come in for their share of usefulness as decorative Ferns, for in their case, owing to the particularly erect character of the plants, the powder is much more conspicuous than in species and varieties with plain fronds.

Besides the natural attractions which they possess, and their value as decorative plants, the cultivation of Gymnogrammes is rendered more general by the simplicity of their requirements. Although one sometimes hears of complaints bearing on their fastidiousness, we feel confident that this is only imaginary. Nearly all of them are most sturdy growers, provided they are kept in a place where they can enjoy a great abundance of light and a liberal supply of water at the roots during their growing season, especially if they are potted in a light compost of a permeable nature, which is the most suitable to them. With the exception of *G. Muelleri* and *G. triangularis*, all the species and varieties of *Gymnogramme* belonging to the Golden and Silver sections require stove treatment, and, in order to keep their foliage in perfect condition, syringing overhead should at all times be carefully avoided.

The genus *Nothochlæna* also supplies us with Ferns which are rendered golden and silver by a coating of powder under their fronds; and among these the most striking are, no doubt, *N. nivea* and *N. flavens* (or *N. chrysophylla*, as it is most commonly called). The outlines of the fronds in both species are very similar to those of an Adiantum, which accounts for their being spoken of by amateurs not particularly well acquainted with them as Golden and Silver Maidenhairs, their black and shining stems, and their roundish and minute pinnules, reminding one forcibly of plants belonging to the genus *Adiantum*. These Nothochlænas are, however, much more easily managed, and therefore much more frequently found in cultivation, than the true Silver and Golden Maidenhairs, *Adiantum æthiopicum scabrum* and *A. æ. sulphureum;* and the white or the yellow exudation, which covers the under side of their fronds, is, in both cases, freely interspersed with the sori, as black as jet. Totally different in appearance from *Nothochlæna nivea* and *N. flavens* is *N. trichomanoides*, a West Indian species, with narrow, pinnate fronds, attaining about 1½ft. in length, and beautifully silvery on the under surface.

As regards the true Golden and Silver Maidenhairs, it may be stated here that both varieties of *Adiantum æthiopicum* are natives of Chili, where they are found growing on bare rocks in elevated and exposed places, and that both are of very dwarf habit, seldom exceeding 8in. in height. The pinnæ of *A. æ. scabrum* are rather large, compared with the size of the plant; they are almost reniform, and copiously dusted on both sides with a white farinose powder; whereas those of *A. æ. sulphureum*, of a similar shape, are much smaller, and only become golden underneath as the fronds become fertile; they are then sparingly powdered on their upper surface, while the under side, thickly covered with yellow meal, is further ornamented by the sori, continuous and well marked all around the edge. It is much to be regretted that, on account of the wrong treatment which they usually receive, these most interesting Ferns have become almost extinct in collections; they are best treated in a cool-house, on a dry shelf, close to the light, where they require very little shading in summer, although during that time they greatly benefit by being kept well watered at the roots, especially if potted in a compost of a very open nature, in which old mortar and brickdust predominate.

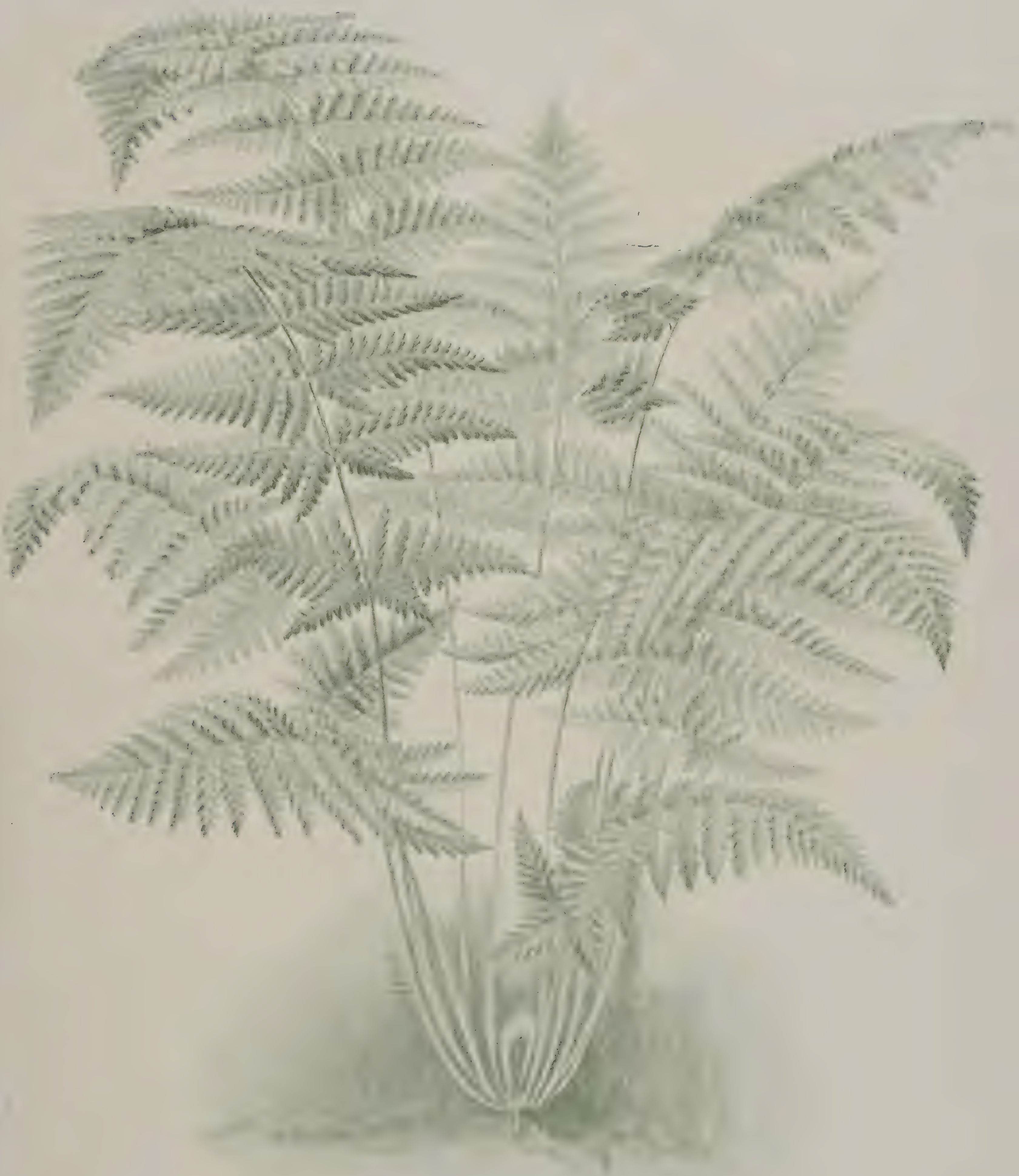
Quite different in habit, as well as in size and vigour, from the above-named Maidenhairs is *Adiantum Williamsii*, a species also native of Chili, but whose foliage, ornamented with golden powder, attains much larger dimensions. This highly decorative and deservedly popular Fern, which is a most satisfactory grower, makes, in a remarkably short time, a splendid specimen, especially when grown in a hanging basket, in which position its long, pendulous fronds, laden with numerous rounded pinnules, develop and show themselves to advantage. The plant shows its beautiful colour in quite a young state, especially along the stalk and on the outside of the partially-developed fronds; but when these are fully grown, the distinctive golden character is discernible only at the base and along the lower half of the stalks. It is, nevertheless, a Fern which, if only on account of the peculiarly yellowish or golden hue of its nearly reniform pinnules, deserves to be grown in every collection.

In the sub-section of Ferns whose "silver" character is not due to the presence of farinose powder, but is only the result of a uniform layer of white or glaucous colour on the under side of their foliage, the most conspicuous, as also the most popularly-known, kinds are, no doubt, the New Zealand *Cyathea dealbata* and the tropical American *Alsophila pruinata*, both Tree Ferns of great interest, the latter of which, though well deserving of cultivation, is but very little known. Both species require the same treatment, which is not in any way different from that recommended in Chapter III., for greenhouse Tree Ferns in general. In both cases their noble fronds partake, to about an equal degree of intensity, of the same silvery character which is shared by several Gleichenias, notably *G. Cunninghami*, *G. rupestris*, *G. circinata* (*speluncæ* of commerce), *G. longissima*, and others more or less frequently found in collections. These handsome and curious Ferns differ from all others by their peculiar mode of growth, their semi-scandent fronds attaining an indefinite length. They are generally credited with a great amount of fastidiousness; this, however, is not the case. It is usually thought that their culture is surrounded with all sorts of difficulties, whereas the magnificent specimens which from time to time one admires at flower shows, seem to point to a totally different opinion. The majority of them attain large size, and grow freely enough if a place suitable to their requirements can be found in the cool-house; above all, they dread close atmosphere, and all require, besides free ventilation, a great abundance of water at the roots at all times of the year, but more especially from April till October, when their growth is very rapid. Their comparative scarcity is due less to the difficulties attending their cultivation than to the slowness of their propagation, which, with the rare exceptions of small batches of seedlings, is generally effected by the division of rhizomes, a somewhat tedious, and not always very satisfactory, operation.

The remaining sub-section of Silver Ferns is that in which the plants derive their character from the superposition of either scales or short hairs on their under surface. Although a few Cheilanthes, such as *C. lanuginosa*, *C. tomentosa*, *C. viscosa*, &c., partake of such a character, the genus *Nothochlæna* is the one which most extensively contributes to this sub-section. The most prominent are the American *N. ferruginea*, *N. Newberryi*, *N. sinuata*, and *N. sulphurea*, and the Nothochlænas of Southern Europe, *N. lanuginosa* and *N. Marantæ*. All these are really charming and highly interesting species of comparatively dwarf stature, few of them reaching over 1ft. in height, and that seldom, while several of them do not exceed 6in. These cannot in any way be considered as intruders when found in company with other Silver Ferns; the more so that, independent of similarity of characters, they delight in the same situation, and succeed under similar treatment. They are easily managed, and prove a source of constant interest when grown in a place where they can be subjected to an abundance of light; but care should always be taken that they are not over-potted.

One of the principal advantages to be derived from the cultivation of Gold and Silver Ferns is that, with the exception of the arborescent kinds partaking of the characters, and of a few of the most gigantic forms of Gymnogrammes, an amateur with only a small amount of space at his disposal can enjoy the natural beauties peculiar to many interesting and valuable specimens. For the benefit of persons willing to give the Gold and Silver Ferns a fair trial, we append a list of the most distinct and decorative kinds, in which those requiring stove treatment are marked with an asterisk (*), while those marked with a dagger (†) will thrive in a greenhouse all the year round. For stove and greenhouse temperatures, see page 27.

- Adiantum æthiopicum scabrum.†
  - æ. sulphureum.†
  - Williamsii.†
- Alsophila contaminans (glauca).*
  - pruinata.†
- Cheilanthes argentea.†
  - a. Borsigiana.*
  - Clevelandi.†
  - Eatoni.†
  - farinosa.*
  - lanuginosa.†
  - Lindheimeri.†
  - rufa.*
  - tomentosa.†
  - viscosa.*
- Cyathea dealbata.†
  - insignis (Cibotium princeps).*
- Gleichenia circinata (speluncæ).*
  - Cunninghami.†
  - dichotoma.*
  - longissima.†
  - pectinata.*
  - rupestris.†
- Gymnogramme calomelanos.*
  - c. chrysophylla.*
  - c. c. Alstoni.*
  - c. c. gigantea.*
  - c. c. grandiceps.*
- Gymnogramme calomelanos chrysophylla Laucheana.*
  - c. c. Martensi.*
  - c. c. Massoni.*
  - c. c. Parsonsi.*
  - c. peruviana.*
  - c. spectabilis.
  - decomposita.*
  - Muelleri.†
  - pulchella.*
  - p. Wettenhalliana.*
  - sulphurea.*
  - tartarea.*
  - triangularis.†
  - trifoliata.*
- Nothochlæna Eckloniana.†
  - ferruginea.*
  - flavens (chrysophylla).*
  - hypoleuca.†
  - lanuginosa.†
  - Marantæ.†
  - Newberryi.†
  - nivea.*
  - sinuata.*
  - squamosa.*
  - sulphurea.†
  - trichomanoides.*
- Onychium auratum.*



Cheilanthes farinosa

(½ nat. size)

CHAPTER IX.

CLIMBING, TRAILING, AND DROOPING FERNS.

THIS section embraces a large number of plants which, from a decorative point of view, are most valuable, while, on account of their peculiar structure, many of them are also of the utmost interest to the botanist as well as to the gardener. The various ways in which most of them can be used render them of great service wherever collections of Ferns are grown for their own merit, the majority of them being specially adapted for growing in places which would frequently, without their presence, be singularly difficult to make pleasant to the eye.

Climbing Ferns.

Of Climbing Ferns proper, there are none but those belonging to the genus *Lygodium;* but although only a comparatively small number of these are known to cultivation, they are sufficiently varied to enable anyone to use them for the decoration of the warm- and of the cool-house. Their peculiar power of twisting and twining around sticks, strings, wires, &c., in the same way as ordinary climbing plants, enables us to fill up certain spaces in the Fernery by employing Ferns exclusively. Lygodiums are all of scandent or sub-scandent habit, and, unlike other Ferns, with, to a certain extent, the exception of Gleichenias, their graceful fronds possess the property of extending to an almost indefinite length. These, under cultivation, frequently measure from 25ft. to 30ft. in length, and form, when carefully trained, charming festoons. The plants are generally free growers, especially the species native of tropical America, Australia, and the Polynesian Islands, whose constitution is more robust than that of the others; on this account they are especially valuable either for covering pillars, for arching over a doorway, or even for training along the glass, where they produce a very pleasing effect. The smaller-growing kinds, with more delicately-divided fronds, which are natives of Japan and North America, are particularly well adapted for growing as window plants, the more so that they can, without any inconvenience, withstand a much lower temperature than the others: these, as well as the tropical kinds, may be used very effectively as rafter plants, and may even be grown on trellises in pots; but in this latter way their beauty is partially, if not totally, destroyed.

The most popularly-grown Lygodium is undoubtedly *L. japonicum*, which, however, is exclusively known in commerce as *L. scandens:* the true *L. scandens* is a totally different plant as regards habitat and general appearance. *L. japonicum* produces some extremely slender growths of a pale green colour, which attain from 8ft. to 10ft. in length. The fertile portion of the fronds, which gives the plant a beautiful and attractive appearance, forms about the upper half of the frond itself, and shows the fruiting spikelets disposed at the apex of each lobe. This lovely species may also be grown with advantage in hanging baskets, under which conditions it makes a really handsome specimen in a remarkably short space of time; especially is this the case if care is taken to train some of the largest fronds along the chains and in the centre of the basket, leaving at the same time those of medium growth to hang all around the sides, which will soon be completely covered, and in a most effective manner.

The charming North American *L. palmatum* is a Fern in which a great deal of interest has been concentrated, as it is probably the only instance recorded in which a plant has received by statute law special legal protection solely on account of its decorative qualities. Besides being very effective as a climbing plant, Mr. D. C. Eaton, in his excellent work, "Ferns of the United States of America," tells us that the carefully-pressed fronds are much used as an article of sitting-room decoration in the cities of Connecticut and other States. For that purpose, the plant is gathered in August and September, and exposed for sale in great quantities, both in fresh condition and as pressed specimens, in the markets of Newhaven and New York. The most astonishing feature in connection with this lovely Fern is the fact that the gathering of it became so destructive that some twenty years ago (1869, we believe) the Legislature of Connecticut passed a special law for its protection, when the offence of wilfully cutting, uprooting, or otherwise destroying it, was made punishable by the infliction of a maximum fine of £20 or twelve months' imprisonment, or even both penalties. As is the case with *L. japonicum*, the greatest ornamental character is imparted to this species by the fertile portion of its very handsome fronds, which climb over other plants to the height of from 3ft. to 4ft. This fructification consists in several of the uppermost pairs of leaflets being paniculately decompound, being pinnately divided, with pinnules generally three-lobed. *L. palmatum* is found growing plentifully in low, moist thickets, and damp, open woods, from Massachusetts to Virginia, Eastern Tennessee, and even Florida.

Among the warm-house kinds, *L. dichotomum* holds a most prominent place on account of its foliage, which is very persistent, and, though somewhat massive, nevertheless very elegant. Its vigorous shoots, which grow to an indefinite length, are well furnished with dichotomously-divided fronds, whose opposite and twice-divided segments grow to 10in., or even 12in., in length, and are of a beautiful bright green colour, and of a coriaceous texture. It is not unusual to find specimens of this species trained on pillars and against the glass, as in the large tropical Fernery at Kew Gardens, where they command the admiration of all visitors. *L. pinnatifidum*, *L. reticulatum*, and a few others, are equally strong growers, and show their characters to the best advantage when grown under similar conditions. Lygodiums require an abundance of water at the roots; the foliage of either warm or cool kinds, having once suffered through drought, never recovers.

In the following list of Climbing Ferns, those marked with an asterisk (*) require stove treatment; the others will thrive in the cool-house.

Lygodium articulatum.*
    dichotomum (pedatum).*
    heterodoxum (Lindeni).*
    japonicum.
    palmatum.
    pinnatifidum.

Lygodium polystachyum.*
    reticulatum (Forsteri).*
    scandens.*
    trifurcatum.*
    venustum.*
    volubile.*

Trailing Ferns.

Covering Tree-Fern trunks or partly-decayed pieces of wood, walls at the end of Ferneries, even clothing rafters and pillars, and joining them together with a mass of luxuriant foliage, and filling up large spaces overhead by means of suspended baskets—these are positions for which Ferns of a trailing habit are particularly well adapted. It is almost impossible for anyone who has not seen living examples to form an idea of the charming effect shown by Tree-Fern stems covered with some of these interesting species; their rhizomes, in a short time, embrace the whole surface of the trunks, and produce in abundance foliage which, for light and elegance, is equal to many of the Maidenhair Ferns, while the foliage of some of the stronger-growing Acrostichums, more massive and perhaps also more durable, although of a heavier nature, is quite as graceful as that of many other kinds of Ferns with more finely-divided fronds. Their usefulness is brought still more forcibly into prominence when we note that there are some adapted to the cool- and others to the warm-house; and that, by a judicious selection, almost any part of the Fernery may be greatly improved by their presence.

If many genera, such as *Lindsaya*, *Pteris*, *Dicksonia*, and *Oleandra*, supply us with one or more members which may reasonably be classed in this section, on the other hand there are certain other genera, such as *Nephrolepis*, *Davallia*, *Polypodium*, and *Gleichenia*, which contain scarcely any other plants but those which can be utilised for the above-named purposes. Foremost among these is the extensive and deservedly popular genus *Davallia*, which is composed almost exclusively of species of great interest, every one of these vieing with each other in usefulness and elegance, though varying essentially in form and habit. Davallias have been found widely distributed: although the majority of the species known at present are natives of the East Indies and the numerous islands of the Malay Archipelago, some come from Australia and New Zealand, and from Japan; while in the South of Europe, Madeira, the Canaries, and the adjacent islands, is found the most popular species of all, *D. canariensis*, commonly known as the Hare's-foot Fern. In consequence of their being naturally scattered over such a large area, and being found in such totally different habitats, many beautiful forms can be made to decorate either the cool or the warm Fernery. Although there are many Davallias quite as handsome, and undoubtedly more decorative, the most conspicuous, as also the most admired, species are, besides the one named above, *D. bullata* (the Squirrel's-foot Fern) and *D. Tyermanni* (the Bear's-foot Fern). The popular names are given to these interesting species in allusion to the brown, grey, or silvery rhizomes with which they are provided, and which, to a great extent, resemble, when deprived of their foliage, the feet of the animals mentioned.

Many Davallias may be used with great advantage as basket-plants; used thus they make charming objects, especially those with slender and flexuose rhizomes, such as *D. bullata*, *D. dissecta*, *D.* (*Leucostegia*) *immersa*, *D. Mariesii*, *D. Novæ-Zelandiæ* (*Acrophorus hispidus*), *D. pentaphylla*, and *D. Tyermanni*, whose natural habit is to twine round and to cover any material on which they are allowed to grow. It is when cultivated in this way that Davallias show to the best advantage. Being nearly all surface-rooting plants, they are satisfied with a small layer of soil, into which their rhizomes must not be allowed to plunge very deeply; in fact, these Ferns thrive best when their rhizomes, which are a constant source of attraction, remain on the surface of the soil. The compost should be formed of three parts of fibrous peat and one part of chopped moss, or, better still, of good leaf mould, if procurable, for all the species are partial to decayed vegetable matter. When Davallias are cultivated in pots or in pans, a thorough drainage is of first necessity, as they require, during their growing season, an abundance of water at the roots; while during the winter, although the waterings must be less frequent, their rhizomes, even those of the thoroughly deciduous species, must never be allowed to become quite dry; this is a most important point to observe in connection with their culture, as if these organs are allowed to shrivel, the growth in the ensuing season will be much weaker.

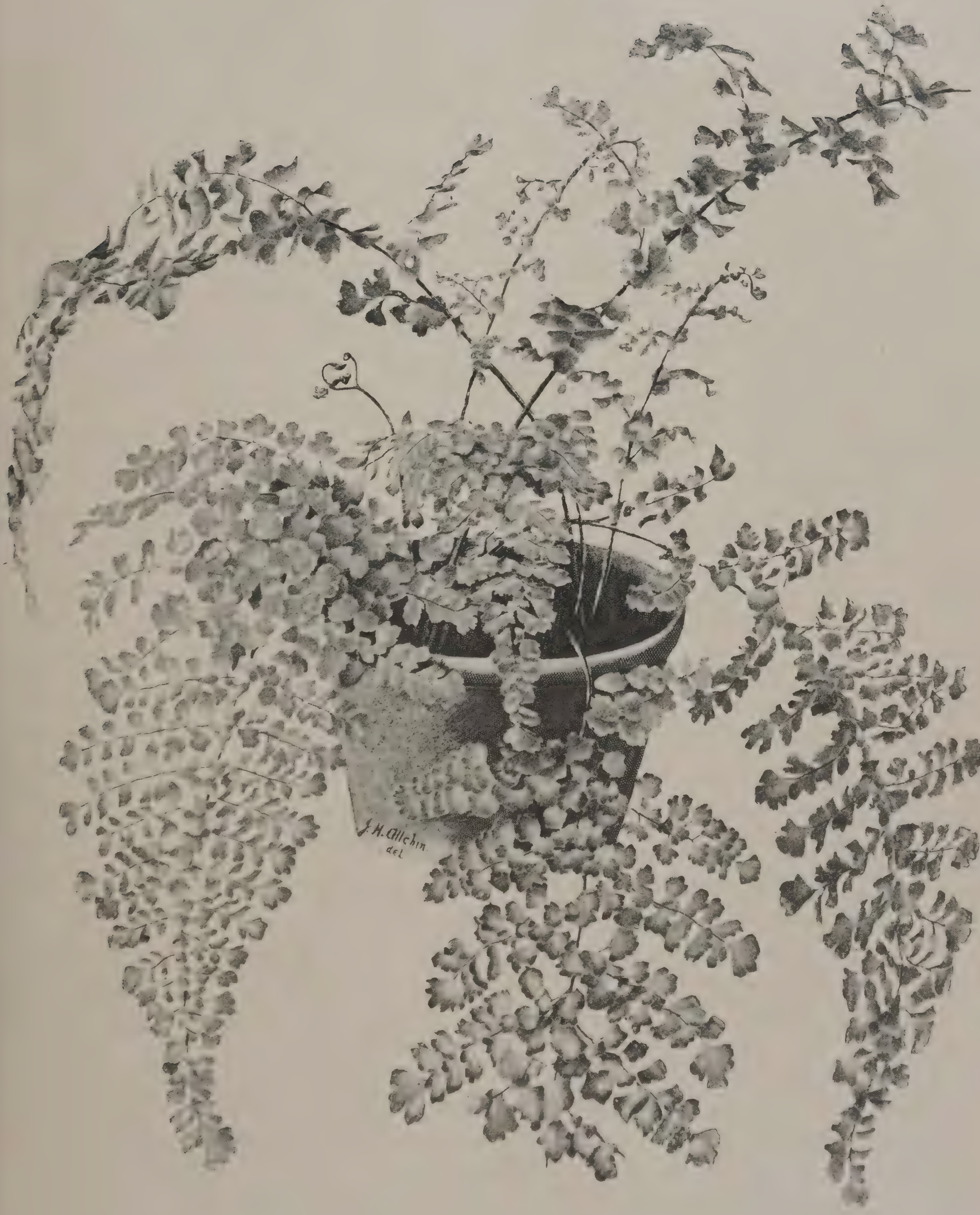
The genus *Nephrolepis*, though not very extensive, is, amongst Ferns of trailing habit, the next in importance to *Davallia*, as all its members, without exception, are equally valuable for planting on decaying wood, Tree Ferns, rockwork, &c. In such positions they rapidly form, on account of their spreading nature, very ornamental masses of a peculiarly striking and attractive character. Like the genus *Davallia*, *Nephrolepis* comprises plants of exceptionally vigorous growth as well as others of very small stature, so that any particular kind may, without difficulty, be accommodated in some part of the Fernery. Should, for instance, a huge projecting boulder require covering, no Fern is better adapted to that purpose than a plant of *N. davallioides furcans*, whose habit is so totally different from all other species belonging to the genus. From a central tuft or agglomeration of crowns, its beautifully-crested fronds, which attain fully 4ft. in length, are produced abundantly all the year round. Instead of being erect in habit, like those of many other species, the weight of the tassels which terminate them gives them a graceful and arching appearance, which is not possessed in an equal degree by any other Nephrolepis. *N. acuta*, *N. davallioides*, and *N. rufescens tripinnatifida*, of equally robust growth, are much more at home when planted in a deep recess or a hollow place, with plenty of space overhead, as their fronds, also about 4ft. long, take a much more erect direction. Among the kinds of smaller dimensions, *N. cordifolia pectinata* (*N. pectinata* of commerce) and *N. philippinensis* are the most distinct. The former, on account of its close, compact, yet graceful habit, and the greyish colour of its comparatively short and slender fronds, is a unique plant.

Although comprising many species of diminutive dimensions, the genus *Acrostichum* also supplies a goodly number of plants which are most useful, either for making boulders and archways naturally ornamental, or for adorning Tree-Fern stems. In their natural habitats, many of them ascend trees by means of the extension of their rhizomes, which are generally thick and of a fleshy nature, and sometimes, as in the case of *A. sorbifolium*, attain 40ft. in length. In most cases, Acrostichums are not only decorative, but equally interesting; for their fructification, disposed on separate fronds, is totally different from that of most other Ferns. In that respect these plants may be classed (as curiosities only) with Osmundas and Anemias, which are commonly termed "Flowering Ferns." Many of the strong-growing kinds—such as *A. acuminatum*, whose shining barren fronds are bipinnate and very drooping; *A. Blumeanum*, *A. cervinum*, *A.* (*Stenochlæna*) *scandens*, *A. sorbifolium*, &c., with pinnate fronds; *A. Herminieri*, *A. scolopendrifolium*, *A. simplex*, and others with simple fronds—are most useful and ornamental, as, through their habit and the texture of their foliage, they are entirely distinct from all other Ferns. They may also be used very effectively as pillar plants, in which case the columns of the house should be surrounded by a cylinder made of galvanised wire, which should be gradually filled up with roughly-broken fibrous peat and sphagnum as the plants require it. Thus grown, they form a fine feature, hiding the supports, which, when naked, are unsightly. Acrostichums are also useful for covering walls, in front of which a wire trellis should be erected. A space of about 3in. must be left between either the wall or the column and the wire trellis, and the interval between it and the wall filled with the compost named above.

The genus *Polypodium* (in which are included *Niphobolus*, *Phegopteris*, *Phlebodium*, *Phymatodes*, *Pleopeltis*, &c., of commerce) also contributes largely to the section of Trailing Ferns; for a great many of the species contained in it are provided with rhizomes of an essentially trailing nature. This character belongs as much to the British species *Polypodium calcareum* (the Limestone Polypody), *P. Dryopteris* (the Oak Fern), *P. Phegopteris* (the Beech Fern), and *P. vulgare* (the common Polypody), as it does to many of the species of exotic origin, either with gigantic upright fronds, as *P. aureum*, or with long, drooping fronds, like *P.* (*Goniophlebium*) *subauriculatum*, or with smaller fronds, such as *P. piloselloides*, *P. repens*, *P. rupestris*, &c. These, and many other species, too numerous to be mentioned here, may with advantage be employed for the purpose of covering Tree-Fern stems, as recommended for Acrostichums, Davallias, &c. They are considered all the more serviceable for that effect in that their culture does not present any serious difficulties, and that among them are found some species adapted for the cool-house as well as others are for the stove. Their propagation is of the simplest description possible, for each portion of their rhizomes (in most cases of a fleshy nature), when provided with two or three fully-developed fronds, readily forms an independent plant if carefully separated from the mother plant.

Gleichenias, especially those which belong to the section composed of plants with orbicular segments or pinnules resembling a quantity of beads, may also be classed among some of the most distinct Trailing Ferns. These plants, besides being highly decorative, are of the utmost interest, inasmuch as their habit, growth, and general appearance, are wholly different from those of any other Ferns. Their growth, instead of being limited to the production of fronds which, as in nearly all other Ferns, when once developed, remain stationary, possesses an altogether distinct character. These organs, which spring from thin, wiry, creeping rhizomes, are either bifurcate or dichotomously divided, according to the different species. In the centre of each frond there is a bud, which for an indefinite period remains latent, but which, in its turn, produces a prolongation of the frond by giving birth to a slender stem, bearing at its summit a pair of fronds similar in shape to the one from which they originated. Each one of these fronds (or even portions of them) in time produces more of the same form and habit. It is the production of fresh fronds from the centre of the older ones, several times repeated, which gives the plants quite a sarmentose, if not even a climbing, habit, and this is rendered all the more interesting by the fact that plants in good health retain their fronds for a considerable time; indeed, it is nothing unusual to see good specimens bearing foliage five or six years old.

Nearly all the plants comprised in the section of Gleichenias proper are natives of New Zealand, Tasmania, and New South Wales, where they are said to form imposing masses of undergrowth, somewhat resembling that of our common Bracken (*Pteris aquilina*), generally extending over vast areas, and of so dense a nature as to seriously impede the progress of travellers. Their shoots keep on growing from one year to another until they attain quite indefinite dimensions, thus continually adding fresh difficulties to be encountered by persons coming in contact with them. Indeed, from all reports, the only way to get through a tract of land in possession of Gleichenias is to cut them down mercilessly—an operation from which, however, they are said to rapidly recover. If such be the case in their native habitats, they certainly lose a great deal of their natural vigour and hardiness when under cultivation, as they always fare very badly after cutting down here, however carefully it may have been done. The statements just referred to may, however, be perfectly true, seeing that the soil in which they delight in their native habitats is essentially different from that which, under culture, gives the most satisfactory results. All Gleichenias that we have seen imported into this country, either dead or alive, from various habitats, came in cases partly filled with some of their native soil, which, to all appearances, invariably seemed of a heavy, clayey character. This is apparently easy enough to imitate, and we know of several instances in which this has been done in such a way as to defy detection, except by analysis. Yet the soil thus manufactured did not answer. Can it be, then, that the native soil contains some elements of which our imitations are destitute; or that, the same salts being present in both soils, our water is unable to dissolve some of them, and therefore the compost is



Adiantum concinnum
(⅕ nat. size).

deprived of some of its nutritious qualities? This we cannot tell. All we can say is that Gleichenias which, at different times, have been grown in a compost made with a view to imitate the soil in which they grow naturally, have proved to be hopeless failures; whereas the most satisfactory results have been obtained by growers who, regardless of the dangers incurred by not following Dame Nature in all her ways and fancies, have sternly adhered to good fibrous peat, roughly broken up and mixed with at least one-third of coarse silver sand. In such a compost, and with an abundance of water at the roots at all times, but particularly during the growing season, there need be little anxiety about their welfare, the more so if they can be grown in a light and airy house, which position will suit most of them.

In this section of *Gleichenia* there are but few acknowledged species—*G. Boryi*, *G. circinata*, *G. dicarpa*, *G. polypodioides*, and *G. rupestris;* but numerous kinds are cultivated and commercially accepted as species. The latter are really simple forms differing from one or other of the above-named species by outward appearance only, but showing no real distinction so far as botanical characters are concerned. The lovely *G. Mendeli*, *G. microphylla*, *G. speluncæ*, and *G. semi-vestita*, are only forms of *G. circinata;* while *G. alpina*, *G. hecistophylla*, and *G. vulcanica*, must only be considered as so many forms or variations of *G. dicarpa*. *G. polypodioides*, from South Africa, is a somewhat more delicate-looking species than most of the others belonging to the same section, and is highly interesting and thoroughly distinct in appearance, owing to the lovely pea-green colour of its elegant little fronds.

Entirely different in general appearance from the above-named species are the plants belonging to the section of *Gleichenia* generally known as *Mertensia*. Their fronds, disposed in whorls, are of a more coriaceous nature; they are also broader, generally dichotomously branched or fan-shaped, and borne on much stouter stems, which show no inclination to become scandent. Their pinnæ, instead of being, like those of the plants belonging to the preceding section, small and beaded or orbicular, are larger and linear in form; the same differences are also apparent in their rhizomes, which, instead of being slender and smooth, are thick and of a fleshy nature, and have a predilection for growing several inches below the surface of the ground. In nearly all cases, too, their stipes, or stalks of the fronds, instead of being smooth and somewhat shiny at the base, are there densely covered with chaffy scales, which vary in colour according to the species. This group is best and most extensively represented by the popular *G. flabellata*, a magnificent Fern, whose appearance—that of a small forest of fan-like fronds —is as handsome as it is singular. It is a vigorous grower, as is amply testified by specimens which, at horticultural shows, are frequently seen measuring 6ft. through, by quite as much in height. *G. Cunninghami* (the Umbrella Fern), of New Zealand, a plant now seldom seen, but always much admired, also belongs to this group. It is of erect habit, and possesses a peculiar appearance, owing to its segments, about 6in. long, being strongly incurved and very glaucous underneath. Then there are *G. dichotoma*, particularly distinguishable by its beautifully glaucous colour; and *G. pubescens*, one of the most striking species, with stout rhizomes, and fronds several times dichotomously divided, their under surface being covered with a peculiar light brown pubescence.

The most striking species of *Gleichenia*, however, is perhaps *G. longissima* (known also as *G. glauca* and *G. gigantea*), a Japanese plant very seldom met with in collections, where it deserves to hold a prominent position. After having been several times imported, and as many times lost, it has at last been established in this country. The great interest attached to this plant lies in its being, apparently, an intermediate form, a sort of link, between the beaded kinds and those belonging to the *Mertensia* group, but more vigorous, or, at any rate, of larger dimensions, than any of the other species contained in either group. The fronds, which are very robust, of rather short stature, and borne on stout stalks of a particularly shining brown colour, are produced from very thick underground rhizomes, and are bifurcate. Instead of having the beaded appearance of the fronds of *G. circinata*, *G. dicarpa*, &c., or of being furnished with linear segments like those of *G. Cunninghami* and *G. flabellata*, they are deeply pinnatifid, with pinnæ alternate, and pinnules dentate and closely set. It is difficult to say what size, under cultivation, these fronds will attain, but compared with other Gleichenias they are very large; for in specimens of comparatively recent importation, the bifurcations already measure 26in. in length by 14in. in breadth, the pinnæ being about 6in. long, gracefully drooping, and the pinnules perfectly flat and beautifully glaucous underneath. The young growths are entirely covered with large, dark (almost black), chaffy scales, which are persistent until perfect development. The bifurcations are very thickly set at their base with pinnules closely disposed, and forming a sort of frilling round the stalk. The whole of the plant is of a delightful green colour.

With the exception of *G. longissima* and *G. dichotoma*, nearly all the Gleichenias are of erect habit, and though belonging, through the nature of their running rhizomes, to the section Trailing Ferns, have very little in common appearance with the plants forming the scandent or sub-scandent group. Some of the thick-rhizomed species are found spontaneous in cool, and others in warm, regions. They require the same treatment as recommended above for other Gleichenias.

Many Hymenophyllums and Trichomanes possessing rhizomes of a very rambling character should also have been included in this section; but, special attention to these most interesting plants being drawn in the following chapter, under the heading of "Filmy or Transparent Ferns," it has not been thought necessary to do more than mention them in this instance. Several kinds of *Lindsaya*, such as *L. divergens*, *L. lanceolata*, *L. lanuginosa*, *L. pectinata*, and *L. trapeziformis*; *Dicksonia* (*Cibotium*) *Barometz* (the Vegetable Lamb); some Oleandras, such as *O. articulata*, *O. nodosa*, and *O. Wallichii*; and the exceedingly pretty *Pteris scaberula*, a New Zealand species, which, for elegance of foliage, rivals any other finely-cut Fern in cultivation, may be said to close this abridged list of Trailing Ferns.

A selection of over one hundred of the most distinct Ferns of trailing and of sarmentose habit is here given. Those marked with an asterisk (*) are strong-growing kinds; the parallel (‖) indicates either sarmentose or erect growers; and, with the exception of the kinds marked with a dagger (†), which require stove temperature, all thrive under greenhouse treatment. For stove and greenhouse temperatures, see page 27.

Acrostichum acuminatum.†*
  alienum.†
  appendiculatum.†
  axillare.†
  Blumeanum.*
  canaliculatum.*
  cervinum.†*

Acrostichum conforme.†
  flagelliferum.†
  Herminieri.†*
  latifolium.†
  nicotianæfolium.†*
  osmundaceum.†*
  (Rhipidopteris) peltatum.†

Acrostichum petiolosum.†*
(Stenochlæna) scandens.†*
scolopendrifolium.†
simplex.†
sorbifolium.†*
subrepandum.†*
tenuifolium.*
Adiantum Feei (flexuosum).*‖
Blechnum Lanceola.†
longifolium.†
Davallia aculeata.*‖
(Acrophorus) affinis.†*
alpina.†
bullata.
canariensis.
(Leucostegia) chærophylla.
dissecta.†
divaricata (polyantha).†*
elegans.†*
ferruginea.†‖
fijensis.†
fumarioides.†*‖
Griffithiana.
heterophylla.†
(Microlepia) hirsuta.
(M.) hirta.†*
(M.) h. cristata.†*
(Leucostegia) immersa.
marginalis (scabra).†*
Mariesii.
M. cristata.
Novæ-Zelandiæ (Acrophorus hispidus).
pallida (Mooreana).†*
parvula.†
pedata.†
pentaphylla.†
pyxidata.†
repens (hemiptera).†
solida.†*
(Microlepia) strigosa.*
Tyermanni.
Dicksonia adiantoides.*
(Cibotium) Barometz.*
cicutaria.*
(Dennstædtia) davallioides Youngii.*
Gleichenia Boryi.†‖
circinata speluncæ.†*‖
cryptocarpa.*‖
Cunninghami.‖
dicarpa.†*‖
dichotoma.†‖
flabellata.*‖
flagellaris.†*‖
longissima.*‖
pectinata.†‖
polypodioides.‖
pubescens.†*‖
quadripartita.*‖
rupestris.*‖
r. glaucescens.*‖
Lindsaya divergens.†
lanceolata.†
lanuginosa.†
pectinata.†
trapeziformis.†
trichomanoides.†
Oleandra articulata.†
nodosa.†
Wallichii.
Polypodium aureum.*
a. areolatum (sporadocarpum).*
Billardieri.
Dryopteris.
(Goniophlebium) glaucophyllum.†
hexagonopterum.
(Goniophlebium) lachnopus.†
(Niphobolus) Lingua.
(N.) L. corymbifera.
Paradiseæ.†*
Phegopteris.
piloselloides.†
pustulatum.
repens.†*
sororium.†
(Goniophlebium) subauriculatum.†*
(G.) subpetiolatum.†*
Swartzii (serpens).†
vacciniifolium.†
verrucosum.†*
vulgare and varieties.

Drooping Ferns.

Ferns with or without running rhizomes, but having pendulous foliage, constitute a special group of plants adapted for growing in hanging baskets. Most of these Ferns, either large or small growers, are provided with rhizomes, the size of which is generally proportionate to that of the fronds which they produce. In most cases these rhizomes are underground, preferring to be slightly covered with soil to being thoroughly exposed. The small-growing kinds are very useful for planting in Fern-cases; while the others, which produce fronds from 6ft. to 10ft. long, and even more, are found of the greatest value for covering Tree-Fern trunks or for growing in hanging baskets of large dimensions. Cultivated in either way, they show themselves to perfection; their pinnæ are, in many cases, rendered handsome, and of striking appearance, through being beset with sori of a beautiful brownish-yellow colour when the spores are ripe. Foremost among these are the Polypodiums, especially those belonging to the *Goniophlebium* group, of which *P. subauriculatum* is the largest representative. As a basket Fern for the warm-house it has hardly any equal: its graceful fronds, which are abundantly produced from creeping rhizomes, are pinnate, with pinnæ deeply cut, and in young plants rather dentate and broad; whereas, in the mature fronds, they are set further apart, are much narrower, and have smooth edges. The sori, as in several other species of the same genus, are sunk in the pinnæ, forming little protuberances on the upper surface. Planted in the centre of a spacious warm conservatory, this species surpasses all others in elegance, and where there is plenty of height to allow the fronds to droop as they like, a specimen (as may be seen in the house of Baron Alphonse de Rothschild, at Ferrières, near Paris, with fronds 12ft. to 14ft. long) is a sight never to be forgotten. *P. lachnopus*, although of smaller dimensions altogether, is just as interesting, but adapted only for baskets of smaller size; while *P. appendiculatum* is quite distinct from any other member of the genus, owing to the deep crimson colour with which its handsome and gracefully-pendulous fronds are ornamented. They grow to about 15in. long, and their midribs and veins, which are of a deep crimson, form a brilliant network, nearly covering their entire surface, the colour being intensified by the exposure of the plant to the action of strong light.

All Nephrolepis are also particularly useful for growing in suspended or hanging baskets, the more so that they all have a curious propensity for taking possession of the outer surface of the basket and of growing all around it, thus making a perfect ball of gracefully-pendulous foliage, which, provided the plants are well supplied with water at the roots, remains in perfect condition for a very long time. For large baskets, few Ferns are more effective than *N. acuta* (*ensifolia*), *N. davallioides furcans*, and *N. exaltata*; while for baskets of small or of medium size, *N. cordifolia pectinata*, *N. philippinensis*, and *N. Bausei* have no equals. *N. cordifolia pectinata* is a form so prolific that there is nothing uncommon in finding in a 10in. basket as many as 120 of its most gracefully-pendulous, slender fronds, which seldom exceed 1ft. in length. *N. cordifolia* (popularly known as *N. tuberosa*, and probably the commonest kind in cultivation) is particularly useful for covering walls; for, although all Nephrolepis possess, to a very great degree, the power of reproducing themselves by means of stolons, or thin, flexible, wiry rhizomes, provided with bulbils, and growing on the surface of the ground, no other is known to propagate so rapidly as this particular one. Besides these reproductive organs, a few species are likewise provided at the roots with small, roundish tubers, of a succulent nature, which also produce young plants in a very short time. *N. pluma* and *N. Bausei* are entirely deciduous, and, from want of knowledge respecting their habit, it frequently happens that they are lost during their resting season; for, if kept dry while they are deprived of their fronds, their tubers, by the time vegetation should commence again, will be found to have ceased to exist. For securing a healthy, strong spring growth, it is essential that the soil which contains them when at rest should be kept all through the winter in a moderately moist condition, so as to prevent them from entirely shrivelling up.

When grown in pans or in baskets, or planted in the Fernery, Nephrolepis thrive apace in a mixture of coarsely-broken peat, chopped sphagnum, and silver sand, in about equal proportions. In this open compost the rhizomes run very freely and produce young plants, which may be safely severed from the parents when they have produced two or three fronds; but the most natural way of growing them is, undoubtedly, on partly-decayed wood, or on Tree-Fern stems, in which positions they are even more effective than Davallias.

Several Aspleniums, such as *A. caudatum* and *A. longissimum*, are very ornamental when grown in baskets of large dimensions, whereas *A. flabellifolium* and *A. Sandersoni* are only adapted for growing in small baskets. The genus *Adiantum* also furnishes its small contingent of basket or Drooping Ferns: the most generally used for that purpose are *A. lunulatum*, *A. caudatum*, and its variety *Edgeworthi* or *incisum*, all of which are of exceedingly graceful habit, and are rendered still further interesting by their proliferous nature—each frond being terminated by a young plant, which develops fronds of a very good size without being in contact with any soil whatever. The same remarks equally apply to the beautiful *Gymnogramme schizophylla* and its more vigorous variety *gloriosa*, the only known proliferous members of the genus. *Pteris moluccana* and *Woodwardia radicans* are two of the most gigantic-growing Ferns adapted to basket-culture; the former requires warm-house temperature, while the latter is one of the best known and most appreciated of cool-house Ferns.

In the following list of Ferns with Drooping Foliage, adapted for growing in hanging baskets, the dagger (†) indicates that stove treatment is required (those not so marked thrive in the cool-house), and strong-growing plants are marked with an asterisk (*). For stove and greenhouse temperatures, see page 27.

- Adiantum æthiopicum.
  - æ. assimile.
  - caudatum.†
  - c. Edgeworthi (incisum).†
  - concinnum.†
  - digitatum (palmatum).
  - lunulatum.†
  - l. dolabriforme.†
  - Moorei (amabile).†
- Asplenium caudatum.†*
  - flabellifolium.
  - flaccidum.
  - longissimum.†*
  - obtusilobum.†
  - Sandersoni.†
- Davallia bullata.
  - (Leucostegia) chærophylla.
- Davallia dissecta.†
  - fijensis.†
  - (Leucostegia) immersa.
  - pentaphylla.†
  - repens (hemiptera).†
  - retusa.†*
  - tenuifolia Veitchiana.†*
- Gymnogramme schizophylla.†
  - s. gloriosa.†*
- Nephrolepis acuta (ensifolia).†*
  - Bausei.†
  - cordifolia (tuberosa).
  - c. pectinata.†
  - davallioides.†*
  - d. furcans.†*
  - Duffii.†
  - exaltata.*

Nephrolepis falciformis.†*
  philippinensis.†
  pluma.†*
  ramosa.†
  rufescens tripinnatifida.†*
Polypodium appendiculatum.
  (Goniophlebium) lachnopus.†
  Paradiseæ.
Polypodium pustulatum.
  (Goniophlebium) subauriculatum.†*
  verrucosum.†*
Pteris moluccana.†*
  scaberula.
Woodwardia orientalis.*
  radicans.*
  r. cristata.

◆

CHAPTER X.

FILMY OR TRANSPARENT FERNS.

THE popular name of "Filmy" is a most appropriate appellation when applied to a section of Ferns whose foliage, in some cases small and slender, in other cases broad and massive, although more or less finely divided, is always of a transparent nature, sometimes so very much like a film as to allow anyone to read even "diamond" (a very small type) through it. These real gems of the *Filices* family, although nowadays seldom seen in private collections, are, undoubtedly, deserving of much more attention than they usually receive at the hands of the ordinary Fern-grower. They combine such beauty and variation of form with extreme delicacy of texture, that no other class of Ferns can compare with those contained in this section; it comprises only three genera, viz., *Hymenophyllum*, *Todea*, and *Trichomanes*, the fronds of each of which are wonderfully transparent. Why these most interesting plants are not more extensively cultivated, it is difficult to understand, as they are, of all Ferns, the best adapted for ornamenting a room. They will grow luxuriantly in the same glass case for years, without ever presenting the wretched appearance that other Ferns do at times when subjected to similar treatment, as the plants belonging to this section retain their fronds for an unusually long time. We know of some Hymenophyllums, and also some Trichomanes, now bearing fronds which have been on the plants for certainly upwards of ten years. When tastefully arranged on a rockwork made of sandstone, or of other equally porous material, and intermixed with pieces of dead Tree

Ferns, or with logs of partly-decayed wood, these subjects have a charming and unique appearance, and when laden with dew-drops they are truly fascinating: these dew-drops are the result of condensed moisture—a condition most essential to the well-being of all Filmy Ferns.

The requirements of Filmy Ferns as regards heat and light are easily satisfied, and one may almost go as far as to say that no place in the room is too dark for them, although, in order to grow them to perfection a good subdued light, with absolute protection from sunshine, is necessary. Indeed, all they require for growing successfully in the dwelling-house is a close glass case in which a sufficient quantity of moisture can permanently be afforded them, careful watching to keep the sun's rays from them, and a little attention in supplying them with the necessary amount of water at the roots. This last condition is certainly not one giving a very great amount of trouble, as, on account of the close atmosphere in which these interesting Ferns delight, and of the condensation naturally resulting therefrom, the waterings at the roots need not be very frequent.

Filmy Ferns are found in nearly every part of the globe, but, with the exception of *Trichomanes radicans* (the Killarney Fern) and of *Hymenophyllum Tunbridgense* and *H. unilaterale* (or, as it is more commonly called, *H. Wilsoni*), which are indigenous to our own islands, the greater part of them are natives of New Zealand, Tasmania, and Chili, where they are under the influence of a naturally humid climate. Some are found thriving apace all around huge stems of Tree Ferns, while others delight in nothing but decaying vegetable matter. Some of the most beautiful kinds, such as *Hymenophyllum abruptum* (*brevifrons*), *H. hirtellum*, *H. javanicum*, *Trichomanes alatum*, *T. crinitum*, *T. Kraussii*, *T. maximum* (*anceps*), *T. spicatum*, *T. trichoideum*, &c., are inhabitants of the East and West Indian Islands, where they are found on the mountains at high elevations, growing in large masses, and forming a green matting over constantly wet rocks. In such a position, a low temperature, shade, and moisture—all agents indispensable to their well-being—are constantly present. Moisture these Ferns must have, as the delicate fronds of many species are so membranous that, if exposed to drought or to the effects of sunlight for even a very short time, they would completely shrivel up: and, as regards heat, its consequences are equally disastrous; for an hour, or even less, of exposure to a dry, heated atmosphere would be quite sufficient to completely ruin plants which for years may have grown vigorously.

On account of their requiring extra shading, and also moisture in much greater abundance than any other classes of Ferns, Hymenophyllums, Trichomanes, and Todeas are hardly manageable unless kept by themselves. Where these plants are cultivated in sufficient quantity to fill a house, a naturally shaded spot should be selected for it, in a place where the ground can be dug deep enough to allow the side walls to be built without glass. In fact, a Filmy Fernery should represent, as nearly as possible, a natural ravine, simply covered with a glass roof. In such a structure, fluctuations of temperature and dangers arising from changes of atmospheric conditions are greatly minimised, and artificial heat is scarcely necessary.

The reason why Filmy Ferns have for a long time been so neglected, is mostly traceable to the fact that until recently a great many of them were termed "Stove Filmies," and were, consequently, kept in too high a temperature, rendering them a constant source of disappointment. In many cases this proved highly injurious to the health of the plants, especially if the atmosphere, besides being over-heated, happened also to be dry at times, in which instances the results of years of patient labour were destroyed in a few hours.

The more rational mode of culture to which these lovely Ferns are now subjected in various places, and notably in our great national establishment at Kew, is the result of careful observations, and also of a series of experiments made by various practical growers, to whom the success in their cultivation is principally due. The most energetic and indefatigable champion of cool treatment, as applied to Filmy Ferns, and the person to whom most credit for the innovation is due, was Mr. J. Cooper Forster, who, when living in Upper Grosvenor Street, possessed there an excellent collection of these most interesting plants. They were a source of constant recreation to their owner; he had an extensive knowledge of their requirements, was acquainted, not only with their names, but also with their various habitats, and, in many cases, with incidents connected with their discovery, and was particularly fond of discoursing upon the same, thus imparting most valuable and somewhat miscellaneous information to his visitors. For many years this truly practical grower contended that, with very few exceptions, Trichomanes, Hymenophyllums, and Todeas, might, with advantage, be grown in a temperature allowed, during the winter, to fall within a few degrees of freezing-point; for, as he justly remarked, even the kinds indigenous to tropical countries are generally found in mountainous parts, where they usually grow at high elevations. Many of them will even bear freezing. It is on record, for instance, that in Messrs. J. Backhouse and Son's nursery, at York, *Trichomanes radicans* occasionally stands a temperature below zero. We also know that, besides the above-named species, Todeas and Hymenophyllums have, without visible injuries, withstood a temperature of 14deg. below freezing-point at Messrs. J. Veitch and Sons' Chelsea establishment, where, for a whole fortnight, they were frozen into a solid block of ice. When under the influence of the thaw, the fronds gradually recovered their former positions, and, as year after year passed by, it was ascertained that these plants had not suffered from the rigours of the temperature to which they had been exposed. Until the winter of 1879-80, during which the above-stated incident occurred, the "Cool Filmies" had always been covered over in cold weather; but, there being no hot-water pipes in the places where these were planted, and being much exposed to cold winds, it was found impossible, with all due exertions, to keep the frost out. One may, therefore, judge of the anxiety of all concerned in their welfare during that length of time, and also the pleasure experienced when, after the ordeal was over, it was seen that the plants had not suffered in the least. After a very short period they started into fresh growth, which proved more vigorous than that produced by other plants of the same kinds subjected to artificial heat. It need hardly be added that since that time the "Cool Filmies" do not receive any more covering during the winter.

While at Upper Grosvenor Street, where the atmosphere was by no means congenial to them, it was only by dint of constant attention carefully bestowed upon them by a most diligent observer and devoted admirer, that these plants were kept in such perfect condition. This justly-celebrated collection is now the property of Kew Gardens; it was generously presented to that institution in 1888 by Mr. Stuart Forster, who inherited it at the death of his father, in March, 1886. There to this day may be seen in a special case in the cool-house, among the Forster Collection, but greatly improved by the effect of a more genial atmosphere, a unique specimen of the New Zealand kidney-shaped Fern, *Trichomanes reniforme*, measuring fully 3ft. across, with a perfect mass of its curiously-shaped and very transparent fronds, new and old, not only testifying to the excellent treatment received, but also showing the suitability of the spot selected for it, by the innumerable rhizomes which have extended on all sides, and which, gathering additional strength as they grow, form a perfect mass ot vegetation. It is singular that a plant of such size, and in such good condition, should be so very sparing of fertile fronds ; but only two of these have been recorded as having been produced previous to the transfer of the plant to Kew.

The Forster Collection comprises also the best and largest known specimen of the lovely little *Trichomanes parvulum*, from Japan, one of the choicest Filmy Ferns, of small growth, with exceedingly pretty miniature palm-like fronds of a particularly dark green colour, yet very transparent. This most interesting little Fern was imported, quite accidentally, in 1880, on a block of wood covered with *Dendrobium japonicum*, and it is still growing on the original block, from which the Dendrobiums have been detached. *T. venosum*, from New Zealand, *T. exsectum*, from Chili, and *T. humile*, from Java, thrive equally well under the same treatment as that to which the Killarney Fern, *T. radicans*, and its varieties, *Andrewsii*, *concinnum*, *dilatatum*, and *dissectum*, are subjected.

With regard to Hymenophyllums, the same sympathy exists to a similar degree among plants of various origin. Thus the temperature which suits our own British species, *H. Tunbridgense* and *H. unilaterale* (*Wilsoni*), also appears to meet all the requirements of *H. æruginosum*, *H. demissum* (*productum*), *H. dilatatum*, *H. pulcherrimum*, *H. scabrum*, and others from New Zealand ; and of *H. asplenioides*, *H. chiloënse*, *H.* (*Hymenoglossum*) *cruentum*, *H. dichotomum*, *H. fuciforme*, *H. pectinatum*, and others from Chili and Mexico ; as well as those of *H. caudiculatum*, and of the magnificent *H. Forsterianum*, which last, to all appearances, seems to be but a much larger and more vigorous-growing form of *H. caudiculatum*, and which, like that species, is a native of Brazil, whence it was accidentally introduced among some Cattleyas in or about 1874.

All the Todeas, whether the New Caledonian *T. Fraseri* and its Fijian variety *Wilkesiana*, the beautiful New Zealand species, *T. hymenophylloides* (*pellucida*) and *T. superba*, or even any of the reputed hybrids or seedlings raised in this country, such as *T. plumosa* and *T. grandipinnula*, thrive in the same temperature, and under precisely the same treatment, as the Trichomanes and Hymenophyllums above named; so that the objection to growing them on account of the heat they require is much more imaginary than real.

Another cause of the scarcity of Filmy Ferns in collections is the erroneous idea which is prevalent amongst Fern-growers that, being found growing mostly in shady ravines and naturally damp places on mountains, where the air is constantly charged with moisture, it is indispensable for them to be kept permanently moistened overhead. The sooner that notion is disposed of, the easier the culture of these plants will become. It is true they all enjoy having their fronds laden with condensed moisture; but although a few of them, such as *Trichomanes radicans* and its varieties, *Hymenophyllum demissum*, *H. pulcherrimum*, and a few others, do not mind being wetted over, the majority of them are averse to it. Mechanical watering over the fronds should, whenever possible, be carefully avoided, for it is certain destruction to all the hairy or downy species, such as *Hymenophyllum æruginosum*, *H. chiloënse*, *H. ciliatum*, *H. hirsutum*, and *H. scabrum;* as also to the Trichomanes with foliage of similar nature, such as *T. alatum*, *T. apiifolium* (*meifolium*), *T. crinitum*, and *T. trichoideum;* and even those species which are not actually injured by watering overhead do better without it. Such watering is all the more injurious when rain-water is not procurable, as it has been abundantly proved that a Trichomanes or a Hymenophyllum that is frequently moistened with hard water soon loses its vigour. It sometimes happens during the hot weather, when great difficulty is experienced in keeping the temperature sufficiently cool, that, the atmosphere being very dry, a slight syringing is thought necessary in the Fern-case; even then the hairy species should be carefully avoided. Only rain-water at the temperature of the case, or nearly so, should be used for the purpose, and then very sparingly. If the case, frame, house, or whatever the structure devoted to Filmy Ferns may be, is sufficiently well drained, so as to allow for frequent waterings of stones, walls, walks, &c., that will be found sufficient, and even on the hottest days it will not be at all necessary to have recourse to syringing.

The quantity of light to be given to Filmy Ferns has also been a subject of much controversy, as for a long time they were invariably grown in very dark places; but, thanks to the experiments successfully conducted, regardless of expense, by Mr. J. Cooper Forster, we are now in possession of a much sounder knowledge of the subject. At Upper Grosvenor Street, where, as before stated, he grew these plants to perfection, it was proved that, although *Trichomanes radicans* is occasionally seen growing wild in positions so dark and so gloomy that its fronds are scarcely discernible, the place best adapted for its culture, as, indeed, for that of other Filmy Ferns, is a spot where good light, with absolute protection from every ray of sunshine, can be secured. This is borne out by the fact that the strongest and the most numérous growths all make their way towards the light. When Mr. Forster's collection of Filmy Ferns was at its best, its fortunate possessor was particularly fond of showing a large patch of *Hymenophyllum Tunbridgense*, part of which was in the shade and part in the light, and of letting his visitors draw their own conclusions; for, while the portion in the shade gradually dwindled away, that in the light increased in thickness, and the fronds gained in length, many of them measuring fully 4in., which is not a very usual occurrence among cultivated plants of that species.

Contrary to the Todeas, all of which produce their handsome, feathery fronds from an indivisible crown, nearly all the Hymenophyllums, and also the greater part of the Trichomanes, in cultivation are of trailing or creeping habit, and are provided with rhizomes which, in some cases, have the power of firmly adhering to rocks or other material with which they come in contact, as is the case with *Trichomanes radicans* and its varieties; whereas in others, such as in nearly all Hymenophyllums, they simply trail loosely on the ground as if devoid of all power of adhesion. The materials required for growing Filmy Ferns vary according to the nature of the roots and rhizomes of the different species; indeed, the soil is only a matter of secondary importance, as it has been found that almost any material, if sufficiently porous, free from impurity, and possessed of moisture-retaining qualities, is suitable for their growth. As a rule, the species with thin, wiry rhizomes are averse to having them deeply buried, and delight in running through partly-decomposed moss and other vegetable matter; whereas those with thick, fleshy rhizomes are particularly fond of sandstone or of any other porous material of a hard nature, on which their roots run freely, and from which they derive all the nourishment they require.

These beautiful and most interesting Ferns are usually propagated by division of the rhizomes—an operation which is safe enough, but which, the plants being comparatively slow growers, is a process requiring a certain amount of patience.

In the following list, which comprises most of the Filmy Ferns in cultivation, an attempt has been made at dividing them into two sections: those with creeping rhizomes are marked by an asterisk (*), while those without the asterisk are species with indivisible crowns. The strongest-growing kinds are indicated by a dagger (†).

- Hymenophyllum abruptum (brevifrons).*
  - æruginosum.*
  - andinum.*
  - asplenioides.*
  - axillare (apicale).*
  - bivalve (pyriforme).*
  - caudiculatum.*
  - chiloënse.*
  - ciliatum (Boryanum).*
  - crispum (amœnum).*
  - (Hymenoglossum) cruentum.*
  - demissum (productum).†*
  - denticulatum.*
  - dichotomum.*
  - dilatatum.†*
  - elasticum.*
  - elegantulum (pulchellum).*
  - falklandicum.*
  - flabellatum (nitens).*
  - flaccidum.*
  - Forsterianum.†*
  - fuciforme.†
  - hirsutum.*
  - hirtellum.*
  - interruptum.*
  - javanicum.*
  - j. crispatum.*
  - j. flexuosum.*
  - lineare (elegans).*
- Hymenophyllum magellanicum (attenuatum).*
  - Neesii.*
  - obtusum.*
  - pectinatum.*
  - polyanthos (protrusum).*
  - pulcherrimum.†
  - rarum (semibivalve).*
  - recurvum.*
  - scabrum.†*
  - sericeum.*
  - Simonsianum.*
  - Tunbridgense.*
  - unilaterale (Wilsoni).*
  - valvatum (platylobum).*
  - Zollingerianum.*
- Todea Fraseri.†
  - F. Wilkesiana.†
  - grandipinnula.†
  - hymenophylloides (pellucida).†
  - intermedia.
  - plumosa.†
  - superba.†
- Trichomanes alatum.*
  - apiifolium (meifolium).†
  - auriculatum (dissectum).*
  - Bancroftii.
  - bipunctatum (Filicula).*
  - crinitum.

Trichomanes crispum.
cuspidatum (Bojeri).
erosum (muscoides).*
exsectum.*
gemmatum.*
glauco-fuscum.
Hartii.
humile.*
javanicum (curvatum).
Kaulfussii.*
Kraussii.*
labiatum.
maximum (anceps).†
membranaceum.*
parvulum.*
Petersii.*
pinnatum (floribundum).†
Pluma.

Trichomanes pyxidiferum.*
radicans.†*
r. Andrewsii.†*
r. concinnum.†*
r. dilatatum.†*
r. dissectum.†*
r. Luschnatianum.†*
reniforme.*
reptans.*
rigidum (achilleæfolium).
scandens.*
sinuosum (incisum).*
spicatum.
superbum (fimbriatum).†
tenerum (angustatum).*
trichoideum.*
trichophyllum.
venosum.*

CHAPTER XI.

VIVIPAROUS AND PROLIFEROUS FERNS.

THESE form a very numerous and important group, comprising plants of many genera, some of which, such as *Gymnogramme*, *Polypodium*, *Pteris*, *Cystopteris*, &c., have among them only one, or perhaps two, species partaking, as if accidentally, of the above-named characters; whereas others, and principally *Asplenium* and *Woodwardia*, are particularly noted for the quantity of viviparous and proliferous sorts which they comprise. There are several distinct ways in which these singular characters are shown in Ferns. In some instances, such as the popular *Asplenium bulbiferum*, *A. viviparum*, the handsome Japanese *Nephrodium prolificum*, &c., the upper surface only of the foliaged portion of the fronds is wholly or partially covered with adventitious growth; or again, as in the case of *Cystopteris bulbifera*, with numerous small bulbils which answer the same purpose of reproduction. In others, such as *Aspidium (Polystichum) angulare proliferum*, the proliferous characters, instead of being present on the foliaged part of the frond, are entirely restricted to the stalk or rachis; there they are crowded together, and form a perfect mass of young growth which, when left to its own resources, seldom attains any particular dimensions. In other cases, again, such as some of the Adiantums, Aspidiums, &c., the fronds bear (generally at their apex) one solitary bulbil, or produce, as a prolongation to the midrib of their fronds, a young plant which, in its turn, develops into a full-grown subject, and from the extremities of the fronds of which another generation of plants is produced. Then there are Ferns which are proliferous through latent buds being disposed on the stalks, usually at the base (such as Marattias), where, unless they happen to be placed under particularly favourable circumstances, although possessing the power of reproduction, they remain dormant and never develop.

These viviparous and proliferous characters are not limited to any special genera, nor are they peculiar to Ferns of any particular size or habit; for, while there are such proliferous pigmies as *Asplenium flabellifolium*, *A. incisum* (*elegantulum*), and *Fadyenia prolifera*, the gigantic-growing *Asplenium dimorphum* (*A. biforme* or *A. diversifolium* of commerce), *Nephrodium divergens*, *Woodwardia orientalis*, *W. radicans*, and numerous other kinds, are examples of large-growing Ferns possessing the same characters. With a view to simplifying their nomenclature, it is advisable to divide these Ferns, according to the different ways in which the characteristic bulbils or young plants are either produced or disposed upon their various organs, into four groups, as follow:

(1) Plants in which the viviparous character extends over the whole, or over the greater part, of the surface of the leafy portion of the fronds.

(2) Ferns in which the proliferous character, instead of belonging to the leafy portion of the frond, extends only to its stalk or rachis, which is then covered, to a greater or less degree, with adventitious growth.

(3) Ferns whose fronds bear one solitary bulbil, situated at or near to their extremity, or whose tailed appendage is formed by the production of a young plant partaking of the same characters as the parent.

(4) A group exclusively composed of Ferns which have the base of their stalks provided with either stolons, roots, or scales, of a proliferous nature, each of these bearing one or more latent buds or bulbils, which, under favourable circumstances, never fail to reproduce the parent.

Group I.

In the first of these four groups—that comprising Ferns in which the viviparous character extends over the whole or over the greater part of the leafy portion of the fronds—the whole or only a part of their limb is plentifully studded with young plants, all in various stages of formation, from the mere bulbil, no larger than a pin's head, to the small "plantule" furnished with four or five embryo fronds, as is often noticeable in some of the larger-growing forms of *Asplenium*. This group contains, besides the greater part of the genus *Asplenium*, such curiosities as *Hemionitis palmata* (generally and popularly known as the Ivy-leaved Fern), whose five-lobed fronds are rendered very conspicuous by the quantity of young plantules which originate from the base of these lobes, and which, even when allowed to remain undisturbed, attain a certain development, their tender roots sometimes covering the whole of the old fronds. It is a pretty, and also a most interesting, plant.

The singular and interesting *Nephrodium prolificum*, from Japan, is another subject in which the viviparous character is wonderfully well developed. Its fronds, somewhat finely cut comparatively to their size and texture (which is very leathery), form a triangular outline, and are borne on stalks varying from 6in. to 8in. long; whereas their limb, or leafy portion, reaches over 1¼ft., and is bipinnately divided. It is an easily-grown Fern, suitable for cool-house culture, and the greatest peculiarity of this singular plant—entirely different in this respect from all other members of its genus—is that of producing in great abundance leafy buds or bulbils, either in the axils of the divisions of the fronds or on the margins of the limb, or even on the stalks or rachides.

Japan further supplies our Ferneries with the handsome, vigorous-growing *Woodwardia orientalis*, whose bipinnatifid and very broad fronds, of a particularly flat nature and very leathery texture, attain from 4ft. to 5ft. in length, and bear on their upper surface a profusion of little bulbiform plants, which, when left undisturbed on the mother frond, rarely, if ever, produce more than a couple of tiny little fronds, but grow rapidly when allowed to fall upon a mossy or otherwise soft and moisture-retaining material.

We have in the North American *Cystopteris bulbifera* another striking illustration of the proliferous character possessed by certain Ferns; for its fronds, from 10in. to 12in. long, with segments of a light green colour and deeply cut, bear on their under side a quantity of small bulbs, which, as soon as they drop to the ground, give birth to little plants in all respects similar to the parent.

As before stated, with a few exceptions, the majority of the Ferns forming this group of plants with viviparous and proliferous characters, are found in the genus *Asplenium*, and this is all the more singular inasmuch as the said character is not shared by any of the Aspleniums, or Spleenworts, of British origin, whereas nearly all the species of exotic origin have it more or less extensively developed. Foremost among these is the popular *A. dimorphum* (*biforme*, *diversifolium*), from the Norfolk Islands, which, probably, is also the strongest-growing kind contained in its genus. The fronds, from 3ft. to 4ft. in length, are, as the name indicates, of two forms; according to their barren or fertile characters, these are bipinnate, with broad pinnæ in the former case, whereas the fertile parts are much more finely divided, tripinnate, and of a bright shining green colour. It frequently happens with this curious and highly decorative plant, that the lower portion of the frond is barren, while the upper part is fertile, and, therefore, much more finely divided. The evergreen nature and vigorous growth of this species render it one of the most valuable among all Ferns grown for indoor cultivation.

From New Zealand we have also the evergreen *A. bulbiferum*, of equally rapid growth, although shorter in all its parts than the preceding species. Smaller still is *A. Colensoi* (*Hookerianum*), also from New Zealand. This species, of particularly compact habit, is probably the most proliferous of all the Aspleniums; for the young plants of it, even when in quite a small state, have their little fronds literally covered with very small bulbils. In *A. flaccidum* we have another New Zealand species extensively partaking of the viviparous character; for its bipinnate, leathery fronds, from 2ft. to 3ft. in length, and of a very pleasing colour and elegantly pendulous habit, are, when mature, thickly studded with young bulbils all over their upper surface. *A. compressum*, a rare species from St. Helena, is distinct from all others on account of its thick and simply pinnate fronds, which are of a very fleshy texture, and are covered all over their upper surface with young plants. Among the dwarfer forms of this remarkably proliferous genus, the lovely *A. viviparum*, from the Mauritius, occupies the most prominent place. Its fronds, which seldom exceed 1ft. in length, are very finely divided; their colour is of a particularly dark green, unknown in most other Aspleniums, unless it be in *A. Belangeri* (*Veitchianum*), a West Indian species, producing, from an erect caudex, elegant, feather-like fronds from 15in. to 20in. long, which, like those of *A. viviparum*, are at times covered with adventitious growth.

No species surpasses in power of attraction the very singular *Ceratopteris thalictroides* (commonly known as the Floating Stag's-horn Fern). It is essentially an aquatic, but requires stove heat, and may be propagated either from spores, which germinate freely, or from the proliferous buds with which its barren fronds are amply provided. These sterile fronds are about 1½ft. long, and prostrate; whereas the fertile ones are decompound, erect, and from 2ft. to 3ft. in height, and their segments are forked and linear.

To the above may also be added two varieties of *Scolopendrium vulgare*, individually named *densum* and *proliferum*, in which the leafy portion of the fronds is thickly studded with little plantules, as in *Asplenium bulbiferum* and *Nephrodium prolificum.*

Group II.

The second group—that in which the proliferous character, instead of belonging to the leafy portion of the frond, extends only to its stalk or rachis—though not so extensive as the one just treated, comprises plants belonging to several distinct genera. We find, among the gigantic-growing kinds, the deservedly-popular *Woodwardia radicans*, native of St. Michael and the Azores, bearing several adventitious buds on its stalks or rachides, and there only. This species, unsurpassed as a basket Fern for a cool-house, has of late years become perfectly acclimatised in some parts of England, especially in Cornwall, where it has been planted in an outdoor Fernery, and under the shelter of the trees, and where it is thriving uncommonly well. Several very striking forms of this handsome Fern, all of which to a great extent share the proliferous characters of the species, are known to be in cultivation, and all have, we believe, been introduced equally from St. Michael and the Azores by Messrs. Stansfield, of Todmorden, who for years past have made Ferns a specialty. The most striking of these, *W. r. cristata* (or *Browni*, as it is frequently called), has long, arching fronds furnished with pinnæ and pinnules extensively subdivided, and terminating on each side of the fronds with tufted crests, smaller than the terminal ones, which frequently measure from 6in. to 8in. in width. *W. r. Burgesiana* is a most interesting and distinct form, with pinnæ and pinnules uniformly depauperated and serrated throughout; while *W. r. crispa*, which in a young state is scarcely pinnatifid, except on the lower pinnules, differs from the typical plant by having its pinnæ and pinnules crowded and crisped. It is noteworthy that these varieties are vigorous growers, and that, as regards size, they come very near the original species.

We have in *Polypodium refractum* (*deflexum*) another strong-growing Fern, producing on the stalk and at the axils of the pinnæ little bulbils similar to those of Woodwardias.

Among the exotic kinds of small dimensions, there is the pretty little *Asplenium monanthemum;* its simply pinnate fronds, about 10in. long, are provided at their base with one or a pair of bulbils, which generally develop themselves even when left on the plants undisturbed. This form of proliferousness seems, however, to affect our British species more extensively. In *Aspidium* (*Polystichum*), for instance, there are several kinds which partake of that proliferous character to an almost indefinite degree. Such is the case with *A.* (*P.*) *angulare proliferum*, and its numerous and handsome forms *Crawfordianum*, *Footii*, *Wollastoni*, &c. ; each of these produces, all along its stalks, and at the base of its fronds, small bulbils, which, in a remarkably short space of time, develop into plants in every respect resembling the parents.

Adventive buds are equally existent in the stalks, or at the base of the fronds, of nearly all Scolopendriums, and of most Nephrodiums belonging to the *Filix-mas* section ; and although proliferation in Ferns is now treated as if it were quite a recent discovery, practical men have for a very long time been perfectly cognisant of it, and aware of its advantages, as may be gathered from the fact that, some twenty years ago, when trade in British Ferns was at its best, crested varieties of *Nephrodium Filix-mas*, and crested, muricated, crimped, and other forms of *Scolopendrium*, were likewise extensively propagated by means of these adventive buds. If not separated in good time from the mother plant, while in a latent state, the buds become abortive ; but it must be borne in mind that, unlike the proliferous buds or bulbils found on the stalks of *Aspidium* (*Polystichum*) *angulare proliferum* and its sub-varieties, these are not perceptible, and only develop themselves when the stalk, accompanied by a small piece of the caudex, is detached from the plant which bears them—an operation which is best performed when the plants are still at rest, and just before starting into growth again.

Group III.

The third group is that which is formed of plants either bearing one solitary bulbil situated at or near to the extremity of the fronds, or whose tailed appendage is formed by the production of a young plant partaking of the same characters as the parent. To this group belong most of the Ferns best adapted for growing in hanging baskets. It is undoubtedly the most extensive, or, at any rate, the most varied, as it comprises many more genera than any of the other three groups into which Viviparous and Proliferous Ferns are here divided. Species belonging to this third group are so numerous, and of such various habits, that they might be divided into strong and small growers.

The genus *Asplenium* is undoubtedly the one which supplies the greatest number of such Ferns, and some of these, such as *A. caudatum* and *A. longissimum*, belong to the strong-growing kinds. Both are grand species, from the East Indies, producing in great abundance simply-pinnate fronds; these frequently reach from 4ft. to 5ft. in length, and are provided at their extremity with an adventitious bulbil which, by its development while still on the parent plant, considerably adds to the size of the fronds. Although closely allied, these two species are totally distinct from each other; for in *A. longissimum* the pinnæ are somewhat roundish and smooth at the edges, whereas those of *A. caudatum* are long, deeply cut when fertile, and attenuated towards their extremities, thus making the fronds of a much greater width than those of the former species; for in well-grown and vigorous specimens they usually measure from 7in. to 8in. in width. The truly magnificent, but unfortunately now very rare, *A. rhizophorum* (*A. rachirhizon* of commerce) might be classed with the above but for the general appearance of its fronds, which are tripinnate, with pinnæ finely divided, and apex lengthened into a tail bearing a young plant at the end; it is an evergreen species from the West Indies, and is well adapted for basket-culture.

To the genus *Gymnogramme* we are indebted for perhaps the most beautiful of these viviparous Ferns, *G. schizophylla* and its splendid variety *gloriosa*, which are essentially distinct from all other known Gymnogrammes, and whose fronds are produced in abundance on very slender stalks of a reddish-brown colour, and of a very glossy nature. These fronds, which arch gracefully on all sides, are from 20in. to 24in. long, their leafy portion being about 4in. wide and very finely cut, with the ultimate pinnules deltoid and very minute. A remarkable peculiarity possessed by these Gymnogrammes is the furcation of the rachis at about two-thirds of its length, where it becomes viviparous, every frond producing a young plant at the point of furcation.

Nephrodium (*Phegopteris*) *effusum divergens* is a beautiful and highly ornamental variety from the West Indies; its broad, decompound, and finely-divided fronds are from 3ft. to 4ft. in length, and of a very pleasing light green colour.

In the evergreen and erect-growing *Aspidium* (*Polystichum*) *aculeatum vestitum*, from New Zealand, we have one of the most striking of all the strong-growing kinds of Viviparous Ferns. Its bipinnate fronds, which are of a peculiarly rich dark green colour, and vary from 2ft. to 3ft. in length, are abundantly produced from an upright thick crown, which, like the base of the fronds, is densely clothed with chaffy scales, nearly ½in. long, black in colour, and bordered with brown. A peculiarity noticeable in these scales is that, while they decrease in length, they gain in breadth as they advance towards the summit of the fronds, thus forming a conspicuous, thick, imbricated band along the under side of the stalk.

Among the smaller-growing kinds of Proliferous Ferns the genus *Adiantum* is particularly conspicuous. It possesses at present four proliferous representatives (two species having each one distinct variety), all of which are natives of the East Indies. The showiest of them all is *A. lunulatum*, a very distinct and equally handsome species, of particularly slender and pendulous habit: its fronds, simply pinnate, beautifully drooping, furnished throughout with half-moon-shaped pinnæ of a bright green colour, attain about 20in. in length; and it is not at all unusual to see at their extremity young plants, which, in their turn, produce others, so that four, or even five, generations are sometimes developed on the same plant in the course of one season's growth. Unfortunately, this is a deciduous species, to which special attention must be paid during the winter, as the crown is then in danger of being kept too dry, and may thereby disappear altogether. *A. l. dolabriforme* is an evergreen form of recent introduction, somewhat resembling the species in general appearance, though its fronds are much shorter, and are borne on much slenderer stalks; but they partake to a very great degree of the proliferous character and pendulous habit of the type, and the plant possesses the great advantage of retaining its foliage all the year round. The foliage of both these plants is of a light and cheerful green, and it is also distinguished by the shining ebony-black colour of the stalks, peculiar to Maidenhair Ferns in general. The other proliferous species of this genus, *A. caudatum*, is an evergreen plant, with pubescent, pinnate fronds, about 1ft. in length, and of a dull greyish colour, which is quite distinct from that seen in any other Adiantum; the stalks, which are very flexible, and of a brittle character, are densely clothed with short, brownish hairs, which greatly help to produce the pubescent character to which allusion has been made. In the variety *ciliatum* (*Edgeworthii*) the fronds are longer and broader than in the type; they are also of a much more pleasing colour, the pinnæ are more deeply cut, and the plant shows altogether a most robust constitution, and is less liable to the depredations of thrips, which are very partial to the foliage of *A. caudatum*. The last-named variety, although the dwarfest of the four known Proliferous Adiantums, is probably the most interesting, if not also the most decorative: its delicate, pubescent, simply-pinnate fronds are, when young, adorned with a lovely pinkish hue which none of the others possess, and which gradually shades off into a pale greyish-green, thus greatly enhancing their beauty. The two species and their two varieties are all well adapted for growing in hanging baskets of small dimensions. Thus treated, the graceful habit of the plants, as well as the way in which the young ones are produced at the ends of the fronds, is shown to perfection. These four Proliferous Maidenhair Ferns need stove temperature, and are all shallow rooters, requiring, to attain their full development, but little soil, and that of a very light nature; peat and sand, or, better still, sandy leaf-mould, being the most suitable compost in which to grow them. Although particularly fond of a moist atmosphere, the fronds of these Adiantums must not be wetted, as they become black, and show unmistakable signs of decay, if in immediate contact with water for any length of time.

Among the most interesting kinds of Proliferous Ferns belonging to this "one-bulbil group," we find the North American Walking Fern, *Scolopendrium* (*Camptosorus*) *rhizophyllum*, a species with simple fronds from 8in. to 10in. long, lanceolate and running out to a point, which arches over, and attaches itself firmly to the ground: hence its popular name. *Fadyenia prolifera* is another very interesting and highly curious Fern, which has two totally distinct sorts of fronds, the sterile ones being dark green, prostrate, and proliferous, and the fertile ones much longer, narrower, erect, but not proliferous. Again, there is the West Indian *Aspidium* (*Polystichum*) *viviparum*, an evergreen species with erect caudex, from which glossy dark green fronds, of great substance, and of a somewhat prickly nature, are produced with great regularity, forming a very handsome plant, which seldom attains more than 20in. in height.

Of Aspleniums there are numerous sorts whose fronds are provided with a solitary and terminal bulbil. Most conspicuous among these are the delicate little Australian *A. flabellifolium*, with its pretty fan-shaped pinnæ, the reddish-brown sori covering the under side; *A. alatum; A. attenuatum;* the rare and pretty *A. brachypteron*, from Fernando Po, where it grows at a high elevation on the Cameroon Mountains; *A. lunulatum* (*erectum*) *Fernandesianum* and *A. l. tenellum;* and the attractive little *A. obtusilobum*, a pretty, dwarf, trailing species from the Fiji Islands, with pinnate fronds from 4in. to 6in. long, proliferous at their apex, and making a dense, compact mass of foliage, &c. Then there are the curious *Pteris* (*Doryopteris*) *palmata*, *P. pedata*, *P. sagittifolia*, and the equally strange *Hemionitis cordata*, in all of which the bulbil, instead of being terminal, is situated at the base of the limb of the fronds; and various other kinds partaking of the same character.

Perhaps the most interesting of all in this group is *Trichomanes pinnatum* (*floribundum*), the only Proliferous Filmy Fern at present known. It is a native of the West Indies, and its simply-pinnate fronds, from 1ft. to 1½ft. long, are exquisitely transparent; the pinnæ are beautifully fringed on their edges, and the fronds are attenuated, rooting at their extremity. Unfortunately, it is essentially a warm-house species, and, notwithstanding the numerous attempts which have been made, it has constantly refused to thrive under the cool treatment so suitable to most other kinds.

Group IV.

When we come to the fourth group—exclusively composed of Ferns which have the base of their stalks provided with either stolons, roots, or scales, of a proliferous nature, each of these bearing one or more latent buds or bulbils, which, under favourable circumstances, never fail to reproduce the parent—we find that, compared with the three other Proliferous groups already described, it is a very small one indeed. Besides the Angiopteris, all the Marattias, and part of the Platyceriums and Polypodiums known to commerce, it comprises only several Nephrolepis and Adiantums.

The Nephrolepis are all provided with long, wiry stolons or underground rhizomes, which are more or less proliferous, and which, when touching the ground, or when allowed to hang down in a damp atmosphere, produce, at irregular intervals, bulbils, which soon develop into young plants in all respects resembling their parents. Several kinds, such as *N. cordifolia* (*tuberosa*), *N. pluma*, *N. undulata*, and *N. Bausei*, bear some perfect tubers, by which they may also be propagated; but as, with the exception of the first-named of these species, all are of a deciduous nature, great care must be taken that, even when deprived of their foliage, the plants shall have their tubers kept in a moderately moist state, otherwise they will cease to live long before the time comes for them to start into growth again.

When proliferous, the Platyceriums show that character exclusively on their roots. It is, however, interesting to note that, although the roots of *P. alcicorne* are frequently met with perfectly covered with adventitious growths, that peculiar character is shown but very sparingly in *P. a. major*, *P. æthiopicum* (*stemmaria*), *P. biforme*, and *P. Willinckii;* while in the cases of *P. grande* and *P. Wallichii*, although the greatest attention has been paid to the subject, there is no record of their roots ever having produced young plants in either small or large quantities.

Plantules are frequently found on the roots of *Polypodium loriceum* and its variety *pectinatum;* while those of *Hypolepis* (*Cheilanthes*) *Bergiana* are also very proliferous. Several members of the genus *Adiantum* are proliferous on their roots—principally *A. Moorei* (*A. amabile* of commerce), *A. cyclosorum*, *A. diaphanum* (*setulosum*), *A. tinctum roseum*, &c., in which no real rhizomes can be detected, the proliferous bud being situated on the root itself, or, at most, on a sort of stolon which emanates from the base of the crown, and the extension of which is indefinite.

As to *Angiopteris* and *Marattia*, both of which genera are natives of swampy places, the proliferation in their cases is most peculiar. All of them have their fronds, which are of a very fleshy substance, surrounded at their base by succulent appendages forming scales; each of the scales is provided with two latent bulbils, which never fail to develop into plants if inserted in a compost of chopped sphagnum and silver sand, and kept in a warm and moist place. It is an experiment which we have repeatedly tried on all the species belonging to these two genera, and in which we have always been successful.

From the above descriptions it will be seen that, although Ferns of many genera possess them to a more or less developed degree, the proliferous and viviparous characters are shared principally by a few special genera: most of the others have only one or a couple of representatives partaking of it—unless it be that the want of observation has, until now, prevented us from discovering some secret of Nature connected with proliferation existing in most Ferns in the same way as that which affects the plants belonging to the fourth group.

The modes of propagation applicable to these Proliferous and Viviparous Ferns are of the simplest description. In most cases, indeed, Nature seems to have unmistakably indicated the most rational mode of increase: in the case of solitary and terminal bulbils, it is found best not to sever their connection with the parent, as by firmly pegging down the end of each of the fronds to the soil, or to the moss surrounding the plants, the bulbils thus secured rapidly form perfectly independent little plants. As regards species provided with bulbils on their fronds, it is well known that when, of their own accord, the bulbils become detached from the mother plant and drop on to the ground, they soon form independent subjects. This applies particularly to the majority of Aspleniums, especially to those contained in the *bulbiferum* section, such as *A. dimorphum* (*biforme*, *diversifolium*), *A. laxum pumilum*, and *A. Colensoi* (*Hookerianum*), whose comparatively short fronds are at all times literally loaded with partly-developed fronds. The same treatment is equally applicable to other Aspleniums of dwarfer habit, whose foliage is much more finely divided, and at times covered with young plantules bearing no resemblance whatever to the parent plants; the plantules being picked off when provided with three or four rudimentary fronds, and lightly placed on damp, sandy soil, will, without even the help of a close atmosphere, emit roots in a comparatively short space of time, when they may with safety be put into single pots. In a similar way *Nephrodium prolificum*, *Woodwardia orientalis*, and *Cystopteris bulbifera* may be treated; but, as regards the two Hemionitis, *H. cordata* and *H. palmata*, as well as the interesting *Ceratopteris thalictroides*, it should be borne in mind that their bulbils do not bear separation from the fronds, which must therefore be pegged bodily to the soil to allow of the development of the new adventive growth.

In the following select list of Viviparous and Proliferous Ferns, those whose names are marked with an asterisk (*) require stove heat; all the others thrive under cool-house treatment.

Adiantum caudatum.*
  c. ciliatum (Edgeworthii).*
  cyclosorum.*
  diaphanum (setulosum).
  lunulatum.*
  l. dolabriforme.*
  Moorei (amabile).*
  tinctum roseum.*
Angiopteris evecta.
  e. assamica.
  e. Brongniartiana.
  e. hypoleuca.
  e. Miqueliana.
  e. pruinosa.
  e. Teysmanniana.
Aspidium (Polystichum) aculeatum vestitum.
  (P.) angulare proliferum.
  (P.) a. p. Crawfordianum.
  (P.) a. p. Footii.
  (P.) a. p. Henleyæ.
  (P.) a. p. Wollastoni.
  (P.) viviparum.
Asplenium alatum.*
  alternans.
  attenuatum.*
  auriculatum.
  Belangeri (Veitchianum).*
  brachypteron.*
  bulbiferum.
  b. Fabianum.
  caudatum.*
  Colensoi (Hookerianum).
Asplenium compressum.
  dimorphum (biforme, diversifolium).
  flabellifolium.
  flaccidum.
  incisum (elegantulum).*
  laxum pumilum.
  longissimum.*
  lunulatum (erectum).*
  l. Fernandesianum.*
  l. reclinatum.*
  l. tenellum.*
  monanthemum.
  obtusilobum.
  radicans.
  repens.*
  resectum.*
  rhizophorum (rachirhizon).*
  Sandersoni.*
  viviparum.*
  v. nobile.*
Ceratopteris thalictroides.*
Cystopteris bulbifera.
Fadyenia prolifera.*
Gymnogramme schizophylla.*
  s. gloriosa.*
Hemionitis cordata
  palmata.*
  pedata.*
Hypolepis (Cheilanthes) Bergiana.
Marattia alata.*
  attenuata.*
  cicutæfolia.*
  Douglasii.*

Marattia fraxinea.
    Kaulfussii.*
    laxa (Cooperii).*
Nephrodium Filix-mas, numerous varieties.
    (Phegopteris) effusum divergens.*
    prolificum.
Nephrolepis acuta.*
    a. rufescens.*
    a. tripinnatifida.*
    altescandens.
    Bausei.*
    cordifolia (tuberosa).*
    c. compacta.
    c. pectinata.*
    davallioides.*
    d. furcans.*
    Duffii.*
    exaltata.
    pluma.*
    undulata.*
    Zollingeriana.
Platycerium æthiopicum (stemmaria).*
Platycerium alcicorne.
    a. major.*
    biforme.*
    Hillii.*
    Willinckii.*
Polypodium loriceum.
    l. pectinatum.
    (Goniopteris) proliferum.*
    refractum (deflexum).
Pteris (Doryopteris) ludens.
    (D.) palmata.
    (D.) pedata.*
    (D.) sagittifolia.*
Scolopendrium (Camptosorus) rhizophyllum.
    vulgare densum.
    v. proliferum.
Trichomanes pinnatum (floribundum).*
Woodwardia orientalis.
    radicans.
    r. Burgesiana.
    r. crispa.
    r. cristata (Browni).

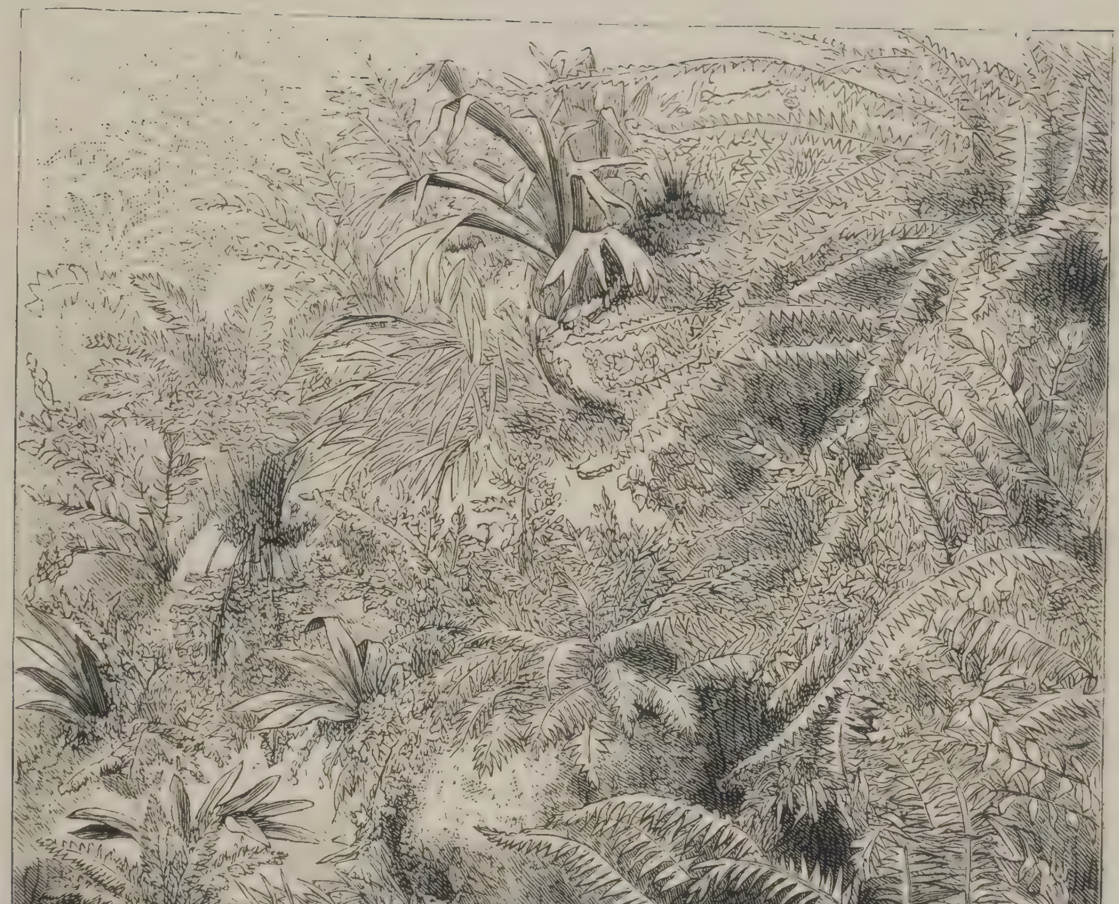
CHAPTER XII.

CURIOUS FERNS.

IN undertaking an abridged, and consequently a very superficial, description of the plants forming the subject of this chapter—devoted exclusively to Curious Ferns, whose appearance is totally different from what a Fern is generally supposed to be, viz., the embodiment of grace and elegance—the Author is particularly desirous of calling the attention of the reader to a class of plants many of which, to the casual observer, would naturally appear to be anything but Ferns.

It is generally admitted that, besides that particular sense which regulates the love of the beautiful, we are also credited with the possession of a certain feeling, akin to that of admiration, which naturally manifests itself at the sight of anything peculiar ; and although we may, in that respect, be far behind the Japanese, we find, besides collectors of beautiful plants, amateurs who have a predilection for bringing together plants of fantastic shapes and habits. These peculiarities are found in almost all classes of plants ; and Ferns, it will be seen, are certainly no exception to the rule. Though not anywise plentiful, Ferns of this description are, however, found amongst British as well as amongst exotic kinds.

Crested, depauperated, or otherwise malformed varieties of species originally and naturally elegant, are not intended for admission in this section of truly Curious Ferns, which section may be said to contain two classes of totally distinct plants, equally interesting as curiosities, though vastly different from a decorator's point of view: the one, comprising species eminently graceful



View of Cool Fernery at Messrs. Veitch's Royal Nursery, showing Treatment of Vertical Wall.

and decorative; and the other, only species of which, if only on account of the peculiarities which characterise them, every well-ordered collection should possess at least one specimen.

Amongst the former section, the entire genus *Lygodium* may be said to occupy the most prominent place, as all its members are, without exception, quite as graceful and decorative as what is frequently, though erroneously, called the Asparagus Fern (*Asparagus plumosus nanus*), which, of course, is no Fern at all. As far as outward or general appearances only are concerned, the Lygodiums do not appear to belong to the Fern family any more than the climbing asparagus; they are climbers, adapted for growing either in the cool- or in the warm-house, and their Fern characters reside, not in their habit, but only in their mode of fructification, and this is only noticeable when the plants have attained a certain degree of development. Indeed, we are frequently asked by the uninitiated if these are really Ferns—a question which, even by the most superficial observation, is readily answered. *Gymnogramme trifoliata* and *G. javanica* are also climbing species, which, in general appearance, have but very little in common with ordinary Ferns. All the above-named Ferns are like so many foliage or flowering plants of climbing habit.

Very different, though quite as great a curiosity as the above-named plants, is the lovely little *Actiniopteris radiata*, found in various parts of India, and which has been described as a miniature Palm-tree. Although much smaller in all their parts—seldom exceeding a few inches in height—its flabellate fronds are the exact representation of those of a Chamærops on a very small scale. Unfortunately, this plant is a somewhat capricious grower; but the variety called *australis*, the fronds of which attain about 6in. in height, and are formed of fewer but longer segments, possesses the same peculiar habit, and is of much easier culture.

Though Platyceriums may, in all fairness, be described as belonging to the section of Curious Ferns, it is evident that in their case they may also claim admission to the list of ornamental plants; for, however peculiar in habit, and however singular their mode of growth, it must be admitted that they all are very decorative in their way. Through their introduction into our Ferneries, many of these structures are rendered particularly attractive, species of what are popularly known as the Stag's-horn Ferns being established either on partly-decayed branches of trees, which may be suspended from the roof, or on pillars covered with cork-bark, in which these singular Ferns grow luxuriantly. Platyceriums form a small but widely-diffused genus of Ferns, all of which are provided with two totally different kinds of fronds, the barren ones being, in most cases, similar in size, as also in their rounded or sub-orbicular shape and convex disposition ; while the fertile ones, on the contrary, differ according to the species to which they belong in their size, which is very variable, in their more or less dichotomously-forked nature, and in their habit, which, in some species, is erect or sub-erect, while in others it is quite drooping. Elk's-horn and Stag's-horn Ferns—all of which are of an epiphytal nature—may be considered as not only the most curious, but also the most beautiful and the most extraordinary, subjects of the whole order. From a purely decorative point of view, the commonest species, *Platycerium alcicorne*, and the rarest, *P. grande*, are, undoubtedly, the most useful. The fronds of the former are abundantly produced, but seldom exceed 2½ft. in length ; they are three or four times dichotomously divided, and their under surface is thinly covered with a substance of a cottony or downy nature, which gradually disappears as the fronds reach maturity ; their upper surface is of a glossy, dark green colour, which they retain as long as they remain on the plants. In the second case, the fertile fronds frequently attain fully 6ft. in length ; and through their pendulous habit, and the peculiar disposition of their elongated, dichotomously-forked divisions, these singular organs give the plants an appearance which is indeed anything but that of a Fern.

The genus *Hemionitis* is another in which the subjects, mostly of tropical origin, are all of curious yet of elegant appearance ; whether we refer to the charming little *H. cordata*, with its neat little heart-shaped fronds, or to the equally singular *H. palmata*, whose curious fronds, 2in. to 6in. wide, are formed of five divisions, all of nearly equal dimensions. Again, the peculiar *H. hederæfolia*, the fronds of which are about 3in. each way, and palmate, is a perfect curiosity. As is the case in the preceding species, the fronds are formed of five lobes ; but these, instead of being of equal dimensions, vary in so far that the two outer, or lateral ones, are shorter and less acute than the others, and have a particularly spreading disposition, which gives them quite the appearance of an ivy-leaf.

How unlike Ferns are the species comprised in the genus *Schizæa*, all of which are plants of comparatively small dimensions, and of very pretty appearance! Very seldom, however, does anyone meet with any of those lovely Ferns with fronds terete or sub-terete, in cultivation: with the exception, perhaps, of the North American *S. pusilla*, their existence is only known from collectors' descriptions, or through dry specimens which from time to time find their way into European herbaria from Australia, New Zealand, Cape Colony, various parts of the West Indies, the Himalayas, the Neilgherries, &c.; for this genus—very distinct in habit, though relatively small—is very widely diffused.

While some genera are entirely composed of Ferns rendered peculiar by their appearance, or by the conformation of their foliage, others, which are specially known and admired for the elegance of the majority of their members, also contain a few species provided with fronds of extraordinary shape, contrasting singularly with those of the greater part of the genus. Even the genus *Adiantum*, of which gracefulness is an acknowledged character, belonging to most of its members, contains some very strangely-foliaged species, such, for instance, as *A. reniforme*, a Madeira Fern, whose kidney-shaped fronds give it the appearance of anything but a Maidenhair, and its connection with that popular genus is only made apparent and indisputable by its fructification, which is essentially that belonging to all other Maidenhair Ferns. The same remarks apply to the New Zealand kidney-shaped *Trichomanes reniforme*, which, in relation to such finely-divided species as *T. trichoideum*, occupies the same position as do *Adiantum reniforme* and its variety *asarifolium* towards the finely-cut *A. cuneatum* and *A. c. gracillimum;* for its broad, transparent fronds have very little in common with the unusually elegant and light character of most Trichomanes, to which its relationship is only shown through its similar fructification. *Lindsaya reniformis* occupies exactly the same position in its genus as do the other above-named kidney-shaped Ferns. *Pteris (Doryopteris) palmata*, with its barren fronds formed of a broad, undivided centre, and five or more triangular lobes, and its fertile fronds cut down to a broadly-winged centre into linear lobes, appears, on a cursory glance, to have as little in common with other members of its own genus as the hastate or triangular-shaped *Asplenium Hemionitis* (*A. palmatum* of commerce), or the entire, broad-fronded *A. Nidus*, has with other finely-divided species contained in the same genus.

The extremely curious West Indian *Acrostichum* (*Hymenodium*) *crinitum*, popularly known, on account of its peculiar shape, and also of its extraordinary texture, as the Elephant's-ear Fern, is undoubtedly one of the greatest curiosities in the whole order. The barren fronds, which are produced from a woolly and somewhat decumbent rhizome, are simple and entire, progressively attaining larger dimensions, until they ultimately measure about 1½ft. in length and 10in. in breadth at their widest part. The whole of their surface, as well as their margins, is covered with long, black, stiffish hairs, which give the plant a most peculiar appearance ; they are borne on stalks varying from 6in. to 8in. long, also densely covered with the same long, black hairs. The fertile fronds are much smaller in all their parts than the barren ones, besides being contracted, and borne on shorter stalks. This strange plant, as well as the dwarf and elegant *A.* (*Rhipidopteris*) *peltatum*, whose fronds, several times dichotomously divided, and showing very narrow linear divisions, are disposed on slender, creeping rhizomes, are as different from other Acrostichums as possible, and anyone may readily be excused for not taking them at a first glance as belonging to the Fern order.

Certain Polypodiums, such as *P.* (*Pleopeltis) fossum* and *P. Xiphias*, and the Australian *Gymnogramme Muelleri*, are so many other instances illustrating the great diversity in habit or in shape of foliage existing between some species and that of the majority of their congeners. The Floating Stag's-horn (*Ceratopteris thalictroides*) bears very little resemblance to a Fern ; and all the Marattias—those giants of the non-arborescent Fern vegetation—have very little besides their mode of fructification to make them rank with ordinary Ferns : yet such they undoubtedly are, the Marattias forming one of the most conspicuous and well-marked genera of the whole order.

The exceedingly curious *Botrychium Lunaria*, or common Moonwort, and the no less peculiar *Ophioglossum vulgatum* (Adder's-tongue), are two very striking examples of cosmopolitan and British Ferns which, from their appearance only, would be precluded from belonging to the order. Both plants produce only solitary fronds, and those of a most peculiar conformation. The former, whose usual habitats are mountain meadows and pastures, though by no means common, is nevertheless found in various parts of England, Scotland, and Ireland. Its crown is composed of a slender tap-root, producing a simple, cylindrical, erect, pale green stem, from the middle of which issues a solitary frond or sterile segment with fan-shaped pinnæ, while the stem terminates in a doubly-compound spike of small, round, light brown capsules. Turner was the first English botanist who mentioned this Fern as an English plant; a description of it, accompanied by a very good woodcut, is found in the third part of his "Herbal," published in 1568, at which time the plant was credited with loosening locks and fetters, and even shoes from horses' feet, and other miraculous properties. In the case of the Adder's-tongue, the solitary frond is also of a peculiarly striking conformation: its stem is pale green, round, and hollow, and tapers downwards. The barren lobe of the frond is stalkless, egg-shaped, and nearly erect; the fertile spike, which, from its somewhat tongue-like shape, gives the plant its popular name, rises from within the barren lobe, which it considerably overtops when the plant is fully mature. Like *Botrychium Lunaria*, this is usually found growing spontaneously in meadows and moist pastures, although it is recorded as having been gathered in an old chalk-pit in an open copse at Abbot's Barton, near Winchester. It is equally found in various parts of England; in Scotland, in Dalmeny Woods, near Edinburgh; in Orkney; in Wales, near Wrexham; and in various parts of Ireland. Turner, in the third part of his "Herbal," mentions it as an English plant, and as one endowed with wonderful medicinal properties.

In *Helminthostachys zeylanica* we have an exotic plant which, although its habitat is mostly restricted to the Himalayas, Cochin China, the Philippines, Ceylon, New Caledonia, and Queensland, possesses the same peculiar mode of growth as Botrychiums and Ophioglossums, producing, from a thick, fleshy rhizome, one solitary frond, with palmate-pinnate, barren segments, from the base of which arises a solitary fertile spike longer than the barren portion.

Other kinds, no doubt, such as Antrophyums, Vittarias, &c., are very unlike ordinary Ferns; but those mentioned above are the species most frequently met with in collections, and are therefore more deserving of special notice than those principally known in herbaria, however desirable the introduction of the latter into this country may appear, and it has been thought advisable to limit the list of these curiosities to plants known in cultivation.

In the following list of Curious Ferns the strong-growing kinds are indicated by an asterisk (*): of the sorts not so marked very few exceed 15in. or 18in. in height.

- Acrostichum (Hymenodium) crinitum.*
    - (Rhipidopteris) peltatum.
    - (R.) p. gracillimum.
- Actiniopteris radiata.
    - r. australis.
- Adiantum reniforme.
    - r. asarifolium.
- Angiopteris evecta, and varieties.*
- Antrophyum, all known sorts.
- Asplenium Hemionitis (palmatum).
    - H. cristatum.
    - Nidus.*
    - N. australasica.*
- Botrychium, all known sorts.
- Ceratopteris thalictroides.*
- Gymnogramme javanica.*
    - Muelleri.
    - trifoliata.*
- Helminthostachys zeylanica.
- Hemionitis cordata.
- Hemionitis hederæfolia.
    - palmata.
- Jamesonia imbricata.
- Kaulfussia æsculifolia.
- Lindsaya reniformis.
- Llavea cordifolia.
- Lygodium, all known sorts.*
- Marattia, all known sorts.*
- Oleandra neriiformis.*
- Ophioglossum, all known sorts.
- Platycerium, all known sorts.*
- Polypodium (Pleopeltis) fossum.
    - Xiphias.
- Pteris (Doryopteris) ludens.
    - (D.) palmata.
    - (D.) sagittifolia.
- Schizæa, all known sorts.
- Tænitis, all known sorts.
- Trichomanes reniforme.
- Vittaria, all known sorts.

CHAPTER XIII.

DRYING FERN FRONDS.

It is not only in their living state, and when in fresh condition, that Ferns are decorative and interesting: they are also a great and constant source of enjoyment when carefully preserved in a dry state. The fronds being flat, the majority, if not the whole of them, may, with a little attention, be dried in such a way as to be very nearly as attractive in that state as when in full growth. It is quite as pleasant to refer to fronds thus preserved as it is to consult drawings or paintings—more or less exact and trustworthy—of flowers gone by which, on account of their size, shape, or nature, it is found impossible to preserve in the same way. In the case of dried fronds there can be neither exaggeration nor deception ; the size and shape are sure to be exact, and, if carefully prepared, the colours of the species may equally be depended upon.

It must be borne in mind that, although they may be placed under exactly similar conditions, some Fern fronds will retain their colour much better than others. Hymenophyllums, Todeas, and Trichomanes, for instance, seldom become discoloured through the process of drying ; in fact, it may be broadly stated, that all thin-textured fronds keep their colour far better than those which possess more substance, such as some of the Lomarias, Acrostichums, Aspleniums, Davallias, Polypodiums, &c. The reason for such a result is obvious. In the first place, scarcely any moisture is exhaled during the drying of these thin fronds, compared with the amount of it given off by fronds of a more fleshy nature. The latter, on account of their thickness, are also much more liable to injury should the weight applied to them happen to be in any way excessive. It is also remarkable, that while the young and tender fronds of some Adiantums, such as *A. macrophyllum*, *A. rhodophyllum*, *A. rubellum*, *A. tetraphyllum gracile*, *A. tinctum*, &c., which are endowed with the most delicate colours, retain their beauty in a dry state for years without any trouble, others belonging to the same genus are a source of constant anxiety to the operator, and require, besides careful manipulation, an endless amount of attention to retain a comparatively small portion of colour. In the latter cases, which, however, are fortunately the exception, and not the rule, it is only by repeated efforts and through good fortune that one is able to obtain perfect specimens.

In drying Fern fronds with a view to referring to them in the future, no trouble should be spared to insure the preservation of their colours. As such collections are, as a rule, made by persons who can gather their specimens at the proper time, the collectors can afford to wait until the fronds are in the best possible condition for cutting and pressing; and by so doing, and using a little discretion in the matter of selection, they may ensure the retention of the colours when dry.

Drying fronds for purely botanical purposes is an operation totally different from that of drying a collection for the sake of retaining the beauty and interest of the subjects, as specimens collected and preserved for comparison must possess all the characters which are essential to distinguish one from the other. It is therefore indispensable that, large or small, they should be of full size, on which account they frequently require to be doubled up in the herbarium, without the least regard to specially tasteful arrangement; and provided that the spores are present, it matters little if the frond which bears them has remained green, or if it has turned brown, or even black, as colour, in the eye of a botanist, is of little value. Totally different, however, is the work of the amateur collector who, in his leisure hours, treasures up the most beautiful forms, and in most cases limits his work exclusively to them, judiciously leaving out specimens possessed only of botanical interest.

As in other matters of greater or of less importance, there are certain rules which, to ensure perfect success in drying Fern fronds, must be strictly adhered to. These have been gradually worked out by specialists who, through long and careful observations, have succeeded in improving upon already-known methods; and it is to their labours that we are indebted for much valuable information regarding this interesting operation. The first and most important point consists in securing the fronds at the most propitious time, and in a perfectly dry state. When quite matured, they may be gathered at any time of the year, irrespective of seasons; but great care should always be taken to secure them in such a state that neither the least condensed moisture nor wet of any kind should be on them when cut for pressing. The selection of a dry and warm place appropriate for drying purposes is also a point of nearly as great importance as the one just referred to, for it is essential that the drying should be done rapidly and uninterruptedly; and to secure something like even results, it is best to have the fronds placed between two boards. As drying material, blotting-paper is undoubtedly the best; still, it is not indispensable, and there is no particular need of employing it exclusively, for excellent results are also obtained by the use of newspapers, or, indeed, of any paper which is not glazed, and which accordingly will freely absorb the moisture which newly-cut fronds are sure to produce in a greater or less quantity. It was in such material that, some eighteen years ago, we dried, with the most complete success, coloured young fronds of the delicately-tinted *Adiantum rubellum*, *A. Veitchianum*, and *A. macrophyllum*; also of *Pteris quadriaurita tricolor*, young and partially-developed fronds of *Davallia divaricata*, and, above all, a magnificently-tinged frond of *Adiantum tenerum Farleyense*, which had been grown close to the light, and which was of a lovely pinkish hue; all these fronds have to this day retained their colours so wonderfully well as to appear even now quite fresh.

After they have been gathered, the fronds must not be allowed to shrivel in the least, but must be dried immediately. From considerable experience, we find the following plan to be the one which produces the most satisfactory results: Let a frond, if of a large size, or several smaller ones, be put in the paper in such a way as to avoid touching each other; then place between each lot four or five sheets of paper. When several layers have been thus disposed of, put them between two boards, and submit them gradually to the gentle pressure of an ordinary press, or of a weight sufficient to keep them from shifting, but not too heavy, as this, by bruising them, would cause a predisposition to discolour. When laying the fronds in their permanent positions, care must be taken to put every pinna and pinnule in its proper place, as the aspect acquired by the frond at that particular period will be permanently maintained when dry. It is also most important, for the purpose of identification, that, according to their size, either one or several pinnules should, in preparing them for drying, be turned upwards, so as to show the mode of fructification. This will be found of very great importance when the specimens are required for reference, as it will often save the risk of breaking them through manipulation, while it will in no wise affect or spoil their appearance. For the same reason, when dealing with species whose barren and fertile fronds are totally different, it is also necessary to dry one of each, representing the entire development of the plant; if of large size, however, such as those of certain Tree Ferns, Marattias, and Davallias, portions of these same organs varying in size, but sufficiently important to show the distinctive characters, may effectually replace them. In the case of Ferns with fronds having their under side covered with farinose powder, such as Gymnogrammes, Nothochlænas, and Cheilanthes, it will be found very useful to put between the pinnæ additional strips of paper, which will prevent them from sticking together, and which may be removed when the subjects are dry.

Until the fronds are perfectly dry, the paper in which they are laid should be changed every two or three days, and the damp sheets be replaced by others, either new, or previously dried, and well aired; this is of the utmost importance. Care must also be taken to see that they occupy exactly the same position after each successive shifting.

When the fronds are perfectly dry, but not until then, they should be mounted on cardboard; their points, as well as the extremities of their pinnæ, should be fastened by means of a little gum, which is unnoticed, and gives the fronds a more natural appearance than can be obtained by any of the other means generally in practice—such as narrow strips of paper, cotton, &c., all of which contrivances destroy the natural effects of the fronds thus operated upon. Each specimen should, moreover, be accompanied by a label, on which should appear, not only the generic and specific names, but also the synonyms, if any; the habitat or country of which the species is a native, and the medium height of the plant—not in its wild state, but under cultivation. All these details, being the work or the results of the owner's personal observation, may be considered as so much valuable and useful information, upon which one can safely rely in cases of identification, besides being to such a collection the very essence of interest and attraction.

It frequently happens that the fronds, which, when dry, are particularly brittle, are injured by the constant friction to which they are exposed through the various uses to which herbarium specimens are usually subjected. To prevent such mishap, it will be found useful, after the specimens have been fixed on the cardboard as above stated, to have them protected by a sheet of tissue-paper of the same dimensions as the cardboard itself, on which it should be fastened with a little gum on one side. A little camphor kept in the box or drawer devoted to these dry specimens, acts as a preventive against a very minute insect which frequently attacks dried fronds, doing incalculable mischief by perforation. It is scarcely necessary to add, that these specimens must occupy a thoroughly dry place, in which they will remain in perfection for an indefinite length of time.

CHAPTER XIV.

FERTILISATION AND PROPAGATION.

THE relation towards each other of these two subjects is, as regards Ferns, of such importance that they can scarcely be treated independently of one another. The mysteries of the fecundation of these plants being but little known to the majority of even practical growers, it becomes indispensable, before describing the most natural mode of propagation—by spores—to explain as clearly as possible the phenomena by which the rudiments of life are produced. The generation of vegetable life in the case of Ferns is essentially different from that of most other classes of plants, in which it is simply the result of a fertilised flower, and in which everything connected with the process of fertilisation can be observed with the naked eye. In the case of plants that produce flowers, the ovaries, when they are either naturally or artificially fertilised, swell, and in the course of time yield seeds; these, being placed under favourable conditions, possess the property of giving birth to plants which, like the parent plants, are capable of reproducing themselves in a direct manner by means of their flowers.

Fertilisation.

Filices, or, as they are popularly called, Ferns, which form the most important division of Linnæus's twenty-fourth class, *Cryptogamia*, and which, in the second class of Lindley's "Natural System" are called *Acrogens*, the division being *Filicales*, are leafy plants, the leaflets or fronds being produced from a rhizome which, according to the species, either creeps on the surface of the ground, runs below it, or rises upwards into the air. Without exception, these fronds unfold in a spiral manner and are traversed by veins. It is from the under surface of these veins that the "sporangia," which contain the reproductive sporules—the equivalent for seeds in other plants—are produced. They are dependent from the "sporangiferous receptacle," which is a thickened point or lengthened portion of the ultimate "veinules." This receptacle, when formed on the apices of the veinules, is called "terminal"; it is termed "medial" when situated between their base and their apex; "axillary," when on the point of the forking; "compital," when disposed on points of confluence of two or more veinules; and "amorphous," when part of the disk of the frond is changed in texture, and closely occupied by the sporangia. These sporangia, whose shape is either globose, pyriform, or oval, are disposed on each receptacle in crowded masses, termed "sori," which, in most genera, are each furnished with a membranous covering, called an "indusium," which rises from a receptacle, and is of various forms; or the sori are naked, as in *Polypodium*—that is, without an indusium. The sori, besides being of different forms and dimensions, occupy various positions, and, according to these, are called "marginal," when situated close upon the margin of the fronds or segments, as in *Adiantum*, *Pteris*, &c.; "intramarginal," when placed between the margin and the midrib, as in *Dicksonia*; "costal," when close to the midrib, as in *Sadleria* and *Fadyenia*; and "transverse," when elongated, either oblong or linear, and making a continuous or broken line forming an angle with the midrib, as in *Blechnum*, *Lomaria*, *Woodwardia*, &c. The indusium is a membrane produced from the receptacle of each sorus, of a plane, cup-shaped, or vaulted nature, which, as it becomes replicate, generally drops off. When the indusium is produced from the centre of the receptacle, as in *Aspidium*, it is central, and usually orbicular, with its margin depressed and free all round, or it is inflated. When it is lateral, or produced on one side, its shape is either oblong, oval, or reniform, and it is attached by a point or by the base of one side, as in *Nephrodium*; or it may be linear, when its whole length is fastened on the one side of an elongated receptacle, as in *Asplenium*, the other side being quite free. When calyciform, its base is attached all round, and it is entire and globose, as in *Diacalpe*; but after a time it opens with an entire or laciniated margin, forming a cup, which contains the sporangia. In some cases, the whole of the sori of each segment are inclosed in a collective indusium, which is formed by the revolute margin of fertile contracted fronds, as in *Pteris*, while all the margin or lobules of the frond in certain genera, as in *Cheilanthes*, are changed in texture, forming an accessory indusium, with which the interior lateral attached special indusium is more or less connivent. These differences in the arrangement of the sori and the structure of the indusia are of the greatest importance, as they form the distinctive characters on which the separation of genera of Ferns from one another and their relative position towards each other are based.

From what precedes it will be seen that the indusium is a membrane, sometimes totally, sometimes partially, covering the sori, which are themselves collections of sporangia; also that these sporangia—mostly pedicellate, very rarely sessile, in some cases surrounded by an elastic, articulate ring, in other cases perfectly ringless—are the contents of the sporangiferous receptacle, which is the thickened point or lengthened portion of the ultimate veinules. This is most important to bear in mind, as it is from the contents of these sporangia, fertilised in a most peculiar way, that Fern life is generated.

Ferns are flowerless plants which furnish us with ample means for a very interesting study; for there are indeed few, if any, more striking subjects in connection with the science of botany than their singular mode of reproduction. As they do not bear any flowers, Ferns have no seeds proper; these are replaced by spores, which, as we have endeavoured to explain above, are disposed, according to the different genera, in several ways and on various parts of the fronds. The spore, however, differs from the seed proper in not being the product of fertilisation: it is an unfertilised body, by which, in Cryptogams, the species is reproduced through a series of evolutions, and from which, after several transformations, a young plant grows. Some spores are produced sexually, and in that respect resemble the seeds of Phanerogams, or flowering plants, from which, however, they essentially differ in never inclosing an embryo or young plant as the seed does: these spores, in fact, correspond with the embryo itself rather than with the entire seed. Besides these sexual spores, some asexual ones, which may closely resemble them in appearance, are produced by most Cryptogams through a process of budding or cell-division; but they are often very different, and it frequently happens that, through its being subjected to different conditions as regards "food," temperature, &c., two or three varied forms of asexual spores are found on a plant. Taken generally, the spores of Cryptogams, through the reproductive phenomena which they present to the observation of the botanical student, may rightly be considered as amongst the most wonderful subjects to which his attention may be devoted. Their microscopical nature also affords the greatest contrast between their diminutive size and the gigantic dimensions attained by some of their produce.

Mr. Charles T. Druery, in his excellent work on "Choice British Ferns,"* has a remarkable chapter devoted to "The Wonders of the Spore," which is undoubtedly the result of an extensive series of personal and careful observations, and which, treating as it does at length on the minuteness, the fertility, &c., of the subject, we cannot do better than quote here without unnecessary comments. As illustrating the great contrast between the spore and its results, Mr. Druery says: "Take, for instance, the largest of the Tree Ferns: here we have nothing less than a noble, stately tree, possibly 100ft. in height, with a huge, spreading crown and massive trunk in proportion, the whole of which has been developed from a microscopic spore, invisible to the naked eye. If we examine the fronds of that huge tree, we shall probably find the backs entirely covered with small, brown patches, lines, or dots, of which there will be countless myriads upon a single frond; yet, notwithstanding their number, every patch, line, or dot will, under the microscope, resolve itself into not merely a heap of spores, but into a heap of hundreds of capsules, or pods, each of which in its turn, though itself barely visible, contains some forty or fifty spores. Hence, there are many thousands of spores in every patch, or myriads of millions on every frond, every individual of which is capable of reproducing the parent form in all its luxuriant and stately magnificence.

"To bring this illustration of fecundity home to the mind, we have estimated the spores upon a single frond of our native common Polypody (*Polypodium vulgare*), and found that one of the subdivisions of the same size, taken from a Tree Fern, would yield plants sufficient to form a wood as large as Epping Forest. Every frond would bear hundreds of such sub-divisions, and the Tree Fern would probably bear thirty to forty fronds every season. A little calculation, therefore, will show that really inconceivable numbers have to be dealt with. Notwithstanding this marvellous fecundity in point of numbers, it has been demonstrated that it does not end here, each spore being capable of producing, under certain circumstances, not merely one, but several plants, so that there is, practically, no limit to the reproductive powers of the Fern family.

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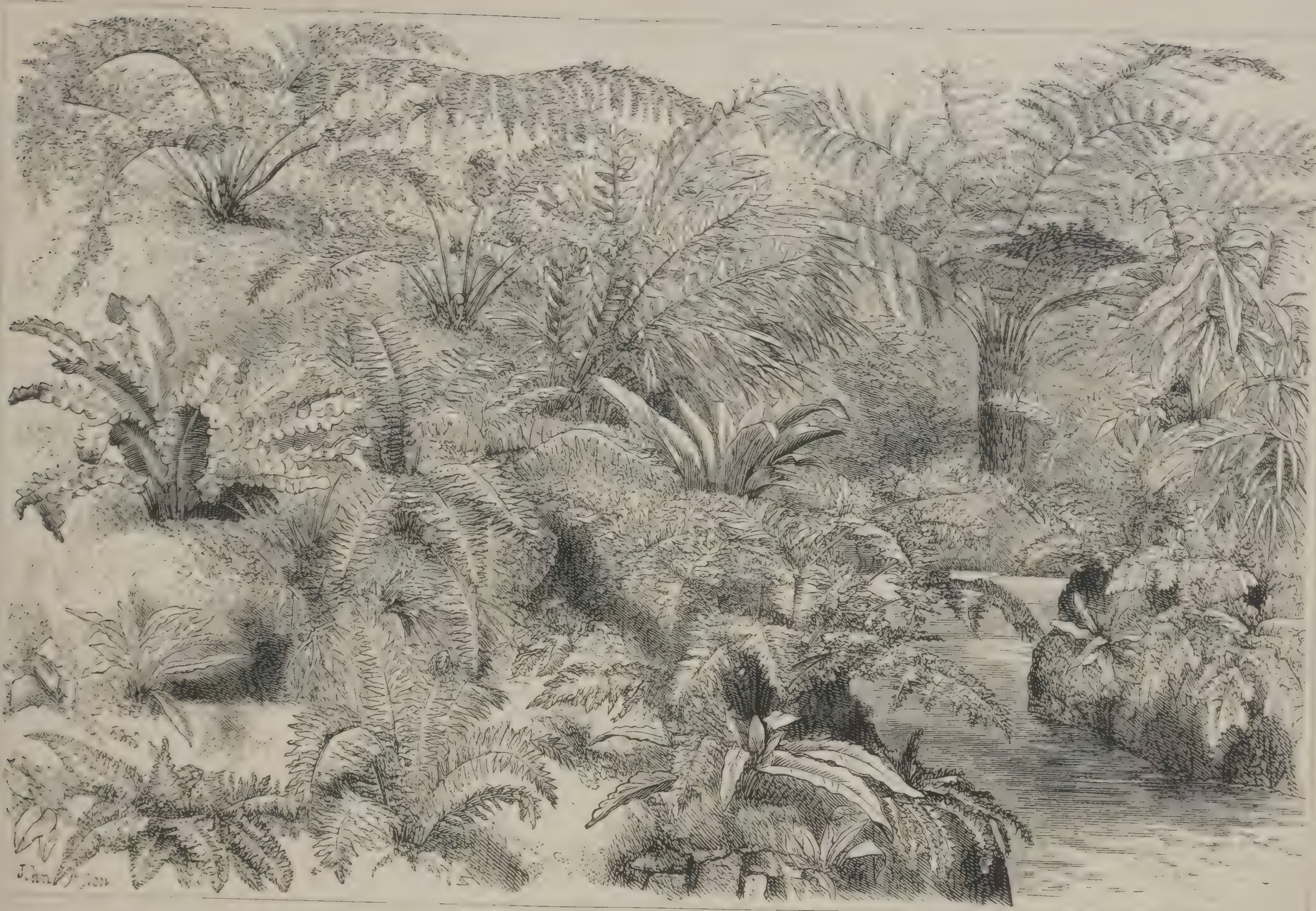
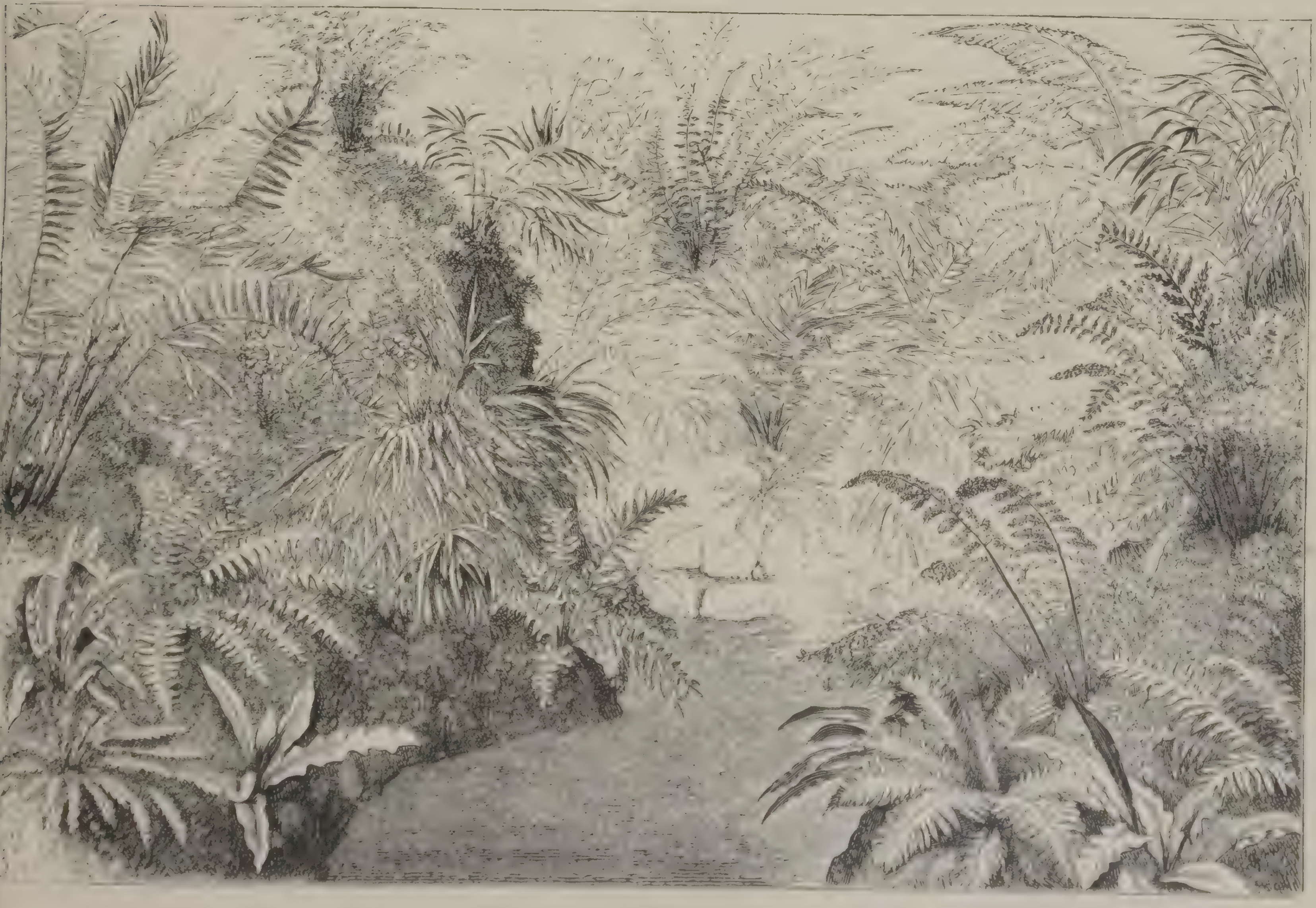
* "Choice British Ferns." By Charles T. Druery, F.L.S. Illustrated. London: L. Upcott Gill, 170, Strand, W.C.

"On the other hand, this wonderful fertility as regards numbers would appear to be very nearly counterbalanced, in a general way, by the minuteness of the spores handicapping them severely in their first stages of development. As an illustration of this, we recently gathered, in the winter, six dead, shrivelled fronds from a plant of the Victoria Lady Fern (*Athyrium* [*Asplenium*] *Filix-fœmina Victoriæ*), and which had, presumably, shed their spores; yet, on placing these between paper, in a warm room, in a few days a heap of remaining spores was shed, sufficient to fill a teaspoon. Our first impression naturally was that this heap consisted merely of the empty capsules, but, to our surprise, the microscope revealed spores in abundance—in such abundance, indeed, that, by careful subdivision, we were enabled to make a fair estimate, and found that there were at least *eighty millions*, a number which, enormous as it is, was, beyond a doubt, far exceeded by that of the spores which had been shed broadcast in the Fernery where the plant was growing. Yet, though the plant has occupied its position for five years, and there are a thousand chinks and crevices around it, which should give the spores a fair opportunity of development, it is a remarkable fact that not a single chance-sown plant has made its appearance amongst the innumerable seedlings of other Ferns which spring up in profusion under identical circumstances. Again, this Fern, which, from its unique and unmistakable form, is fitted admirably for our illustration, was found wild as long ago as 1861, shortly after which, being, as we have demonstrated, a remarkably fertile plant, it was propagated from its spores, and distributed all over the country, so that, at the present date, plants as fertile as the parent exist in every collection, even the most humble. This being so, we would naturally expect that escaped spores from some of these cultivated plants would have yielded apparently wild ones; yet, in the course of twenty-seven years, not a single new find of that form has been recorded.



View of Cool Fernery at Messrs. Veitch's Royal Nursery, showing Treatment of Bank.



View of Rockery at Messrs. Veitch's Royal Nursery, showing Treatment of Banks, &c.

"Our readers would naturally jump to the conclusion, from the foregoing remarks, that the Victoria Lady Fern is especially difficult to raise from its spores artificially, instead of which, if the spores be sown with ordinary care, and protected from disturbance, they germinate freely, and produce abundance of plants, all of the parental type. It is manifest from this that, in some subtle way, the spores of this Fern are more heavily handicapped, under natural conditions, in their early stages of development, than other abnormal forms of the Lady Fern, which become veritable weeds under precisely the same conditions of growth."

Mr. Druery's rational remarks, and the unsatisfactory results to which he alludes with regard to some Ferns not readily reproducing themselves in a natural way from spores, all of which we fully endorse (having had many opportunities of noticing the same), lead us to the explanation of the phenomena peculiar to the first growth from the spore, which is itself an organ not formed by sexual reproduction, but by vegetative growth only. This first growth is called the "prothallus" (from the Greek words *pro*, instead of, and *thallos*, a branch; in allusion to the structure thus named taking the place of a stem). The name is given to a body which is developed from a spore, not only of a Fern, but also of Horse-tail, Club-moss, or Pillwort. According to which of these four groups it belongs to, the prothallus varies much in its form and in its degree of development; but it is in all cases entirely cellular throughout its existence, and on it are found the organs for sexual reproduction. The prothallus, which is produced by simple generation of cells, and has all the appearance of a common Liverwort, is in most plants belonging to the other groups provided only with either male or female organs. In Ferns, it bears the organs of both sexes, which are developed on its under surface, and are akin to sexual organs in flowers, and undoubtedly analogous to the more conspicuous sexes in flowering plants.

This will explain the distinct alternation of generations peculiar in the reproduction of prothallus-producing plants, notably in Ferns. The spore produces, as its first growth, the prothallus, which may be described as a flattened, green, expanded body, growing particularly in damp places, and having a predilection for damp bricks. Except in the middle, where it reaches the thickness of several layers, it is thin, consisting only of a single layer of cells, containing an abundant supply of "chlorophyll" bodies, which give it its colour. The prothallus varies in shape and in size according to the genera, and also according to its age: in the majority of cases it is, when only partly developed, much longer than broad (see Fig. 1); but it rapidly extends in breadth until, when full grown, it generally resembles in outline the conventional figure of a heart, having one end narrowed and a notch in the broader margin (see Fig. 2), and seldom exceeds ¼in. in breadth. Its lower surface then becomes partly covered with tiny root-hairs, each made up of a row of cells. It is also on its lower surface, and along the edges, that the "antheridia," or male organs, are disposed.

The "antheridia," which are usually numerous, and exist in the form of small, cellular protuberances composed of three comparatively large cells, originate as outgrowths of cells of the epidermis; each outgrowth is cut off, as a new cell, by a cell-wall. In some prothalli, the contents of the cell thus formed, and containing a tissue of mucilaginous nature, break up into a number of small, rounded cells, called "parent cells," in each of which is formed an "antherozoid" (see Fig. 3), slender, but coiled spirally in two or three turns, and provided with a tuft of fine hairs or cilia at one end. These antherozoids (from *antheros*, belonging to a flower, and *zoon*, life), which somewhat resemble microscopic tadpoles, and swim actively in the moisture surrounding them, are the analogues of the pollen-grains in flowering plants, while the pollen-cases are represented, in Cryptogams, by the antheridia. There is no doubt that, however different in other details, the physiological action of the antherozoid is similar to that of the pollen-grain, as the only function of this organ is fecundation; this is effected by means of a more or less rapid motion, to which it is subjected by the action of a number of

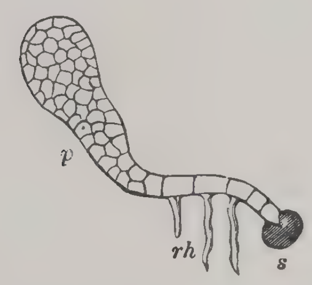


Fig. 1. Young Prothallus
(much magnified).
p, Prothallus; *rh*, Root-hairs of Prothallus; *s*, Spore.

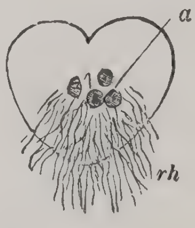


Fig. 2. Lower Surface of Mature Prothallus
(magnified).
a, Archegonia; *rh*, Root-hairs.

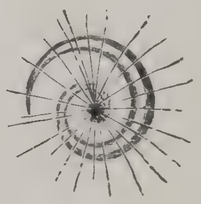


Fig. 3. Antherozoid
(much magnified).

delicate and irritable hairs, situated at one of the extremities of a flattened thread, helicoid in form, which always accompanies this club-shaped vesicle. In most prothalli, however, a process of cell-division goes on in the young antheridium, whereby it is finally made up of a layer of cells surrounding a central cell (see Fig. 4), and, in this central cell, the parent cells are developed, and produce antherozoids. The outer coat, formed by the layer of cells, has to aid in expelling the antherozoids when ripe, and the cells do this by absorbing water rapidly, swelling, and compressing the contents of the central cell till its apex, which is not covered by the layer, is burst (see Fig. 5), the "parent cells" are expelled, and, soon rupturing, set free the antherozoids, which have the faculty of moving rapidly in water, ·or in a drop of dew or rain.

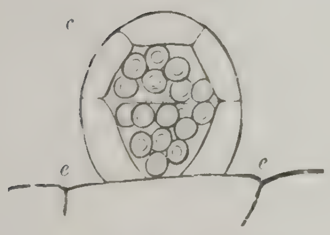


Fig. 4. Young Antheridium

(much magnified).

c, Central Cell, filled with Parent Cells of Antherozoids ; e, e, Epidermis of Prothallus.

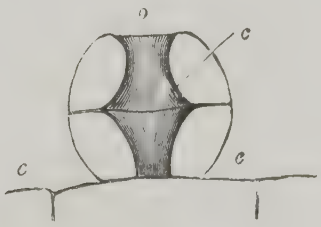


Fig. 5. Ripe Antheridium

(much magnified),

From which Antherozoids have been shed by Opening at o.—c, Empty Central Cell ; e, e, Epidermis.

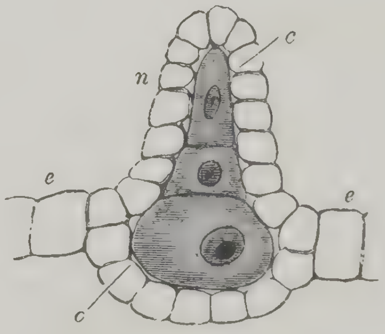


Fig. 6. Immature Archegonium

(much magnified).

c, Canal, still Closed above, and Filled by the Canal-cell ; e, e, Epidermis ; n, Neck-cells ; o, Oosphere.

The "archegonia" (see Fig. 6) are the female organs, in each of which lies the "oosphere"; the latter, fertilised by the "antherozoa," becomes the "oospore." This oospore develops into the Fern-plant bearing the well-known fronds, on the back of which are visible the groups (sori) of minute, brown spore-cases (sporangia), in which lie numerous spores, like the one with which the cycle began. It will thus be seen that the prothallus and the leafy Fern-plant are two generations in the course of a single cycle. The archegonia, which are developed rather later than the antheridia, are situated in the middle of the lower surface of the prothallus, behind the notch already mentioned (see Fig. 2), and in the vicinity of the antheridia. Each of the archegonia, which are by no means so plentiful as the male organs—most frequently not more than two being produced on one prothallus, and then only one of them appearing fertile—originates, like the antheridia, from a cell of the epidermis, from which it grows out in a hemispherical form. These female organs are larger and more compact structures than the antheridia; their constitution is also totally different, for they are built with four tiers of cells and in a sort of columnal form. Their development is effected in this wise: A cell-wall forms, and cuts it off from the cell of the epidermis. It increases in size, and becomes further divided into three layers; and these are again sub-divided by cell-walls. The result is that a structure is formed somewhat in the form of a column, or, better still, of a flask with a long, narrow neck. The hollow of the flask, or large cavity at the base, is occupied by a large cell, the oosphere (see Fig. 7), rich in protoplasm, terminating, when mature, in a kind of style open at the top, and communicating with the cavity below by means of a central canal. The cavity or sac at the base further contains a globose uticle, whose functions are considered analogous to the embryonic sac in the ovules of flowering plants; it surrounds the oosphere, which is regarded as the object to be fecundated, or as the germ that, after impregnation, will set up a growth which ultimately assumes the form of the parent plant.

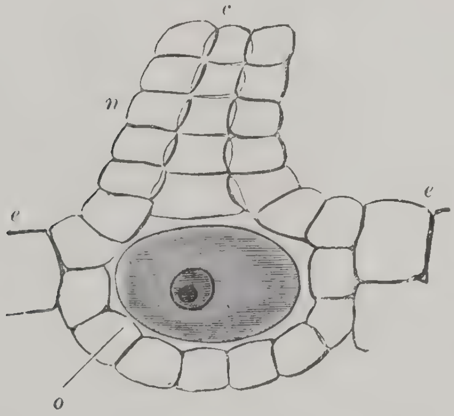


Fig. 7. Longitudinal Section of Mature Archegonium of Fern

(much magnified).

c, Opening of Canal down Neck; *e*, *e*, Epidermis of Prothallus; *n*, Neck-cells; *o*, Oosphere.

From very careful observations it is now beyond doubt that the fecundation of the oosphere is effected as follows: The tube of the neck of the archegonium is at first filled with a narrow cell, the canal-cell, the cell-wall of which becomes mucilaginous, swells, and is expelled from the outer opening of the tube, leaving a passage for the antherozoid down the tube, or central canal, to the oosphere, when the latter is ripe to be acted on by it (see Fig. 7). The antherozoids are caught in the mucilage while moving over the prothallus; they wriggle down the tube, reach the oosphere, and fertilise it. The oosphere very soon begins to grow, and the final result is the development of the oospore into the leafy plant or Fern. It may be mentioned that the oospore, at a very early period, divides into eight cells, in two layers. Of these cells, four lie next the base, and four next the front, of the prothallus. Of the latter, the two farthest from the neck of the archegonium give origin to the first leaf or frond; one, near the neck, to the growing point of the stem; and the fourth to hairs. Of the other four cells, one, opposite to the stem, develops into the root, one ultimately disappears, and the other two form the "foot" of a structure that remains sunk in the archegonium, which has grown so as still to surround the foot (see Figs. 8 and 9). By means of this organ the young plant absorbs nourishment from the prothallus, which, for a time increases in size, but is gradually exhausted and withers away, and afterwards the young Fern is able to nourish itself by its own roots and leaves.

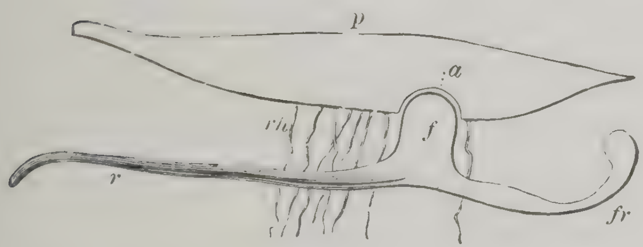


Fig. 8. Diagrammatic Sketch of Connection of Young Fern with Prothallus.

f, Foot of young Fern imbedded in Hollow of enlarged Archegonium (*a*); *fr*, Very young Frond of Fern; *p*, Prothallus; *r*, Root of Fern; *rh*, Root-hairs of Prothallus.

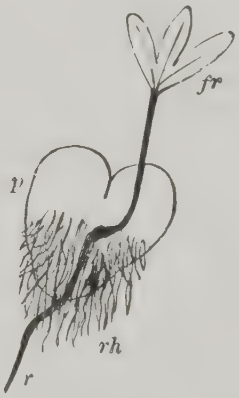


Fig. 9. Young Fern growing from Prothallus (slightly enlarged).

fr, Young Frond of Fern; *p*, Lower Surface of Prothallus; *r*, Root of Fern; *rh*, Root-hairs of Prothallus.

Such are the complicated but exceedingly interesting phenomena resulting in the fertilisation of the spore and in the reproduction of Ferns in general, and for the clear exposition of which we are much indebted to Mr. George Nicholson's "Dictionary of Gardening."*

Propagation.

There are several ways by which Ferns can be, and are usually, reproduced: by spores, by the division of the crowns, by the sectioning of the rhizomes, by the rooting of the proliferous growths found on the surface of the fronds of certain species, or by the development of the latent eyes found at the base of some of the others, &c., all of which we intend bringing into notice later on.

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* "The Illustrated Dictionary of Gardening." Edited by George Nicholson, A.L.S. London: L. Upcott Gill, 170, Strand, W.C.

As with regard to flowering plants propagation is effected by means of seeds, the most natural, as also the quickest, way of reproduction in Ferns is by means of their spores. It is most important that these should be gathered at the proper time—that is to say, when the sori begin to turn brown; the spore-bearing fronds should then be cut, and be allowed to dry for two or three days in paper bags, after which time the spores should be sown as soon as possible. To attain a satisfactory result, it is necessary that the spore-bearing fronds of the required species should be frequently examined, for, notwithstanding the accuracy of the instance of the Victoria Lady Fern given by Mr. Druery, in which case spores in enormous quantities had been found in completely withered fronds, it must be borne in mind that many species shed their spores entirely, and that to wait until the reproductive organs have assumed a uniform brown appearance is to ensure the gathering of perfectly empty capsules. This is particularly the case with regard to *Osmunda*, *Todea*, and a few other genera, the spores of which are all scattered to the winds by the time that the sori are discoloured. Hence the majority of failures experienced by persons who frequently complain that "although the spores sown were of a beautiful brown colour, and great attention was paid to them, the results are anything but satisfactory."

Having secured spores in good condition, the next points of importance are when and how to sow them. Although Ferns may be sown at any time of the year, the early spring (March and April) is the most favourable time for sowing most species, as, if properly treated, seedlings, or at least the greatest part of them, raised then have sufficient time to form crowns strong enough to stand the following winter. When sown later, although the spores come up equally well, there is the risk of the young plants produced being destroyed during the winter months, especially if there should happen to be heavy fogs, which invariably have a most disastrous effect upon them. It may be safely stated that, generally speaking, the sooner spores are sown after gathering, the more readily they germinate; but those which naturally ripen during the autumn or winter months, if collected and kept in paper, in a dry but not warm place, may safely be preserved until the spring, when it will be found that their germination has not been materially affected by the delay to which they have been subjected. As a proof of this assertion, we can offer not only our own successful case of uniform spring sowing, but also the many instances in which nurserymen and botanical gardeners have had to introduce new Ferns from spores received through the medium of their collectors: in such cases, after travelling for several months, the spores cannot possibly be sown soon after having been gathered. An idea of the vitality with which Fern spores are endowed may be gathered from the fact that from spores of *Pteris quadriaurita tricolor* seven years old, sown in 1876, a splendid crop of young plants were raised, and in the course of one season perfectly healthy and robust specimens were produced.

Many ingenious ways of sowing Fern spores have been advocated by persons more or less practical, some even going so far as to recommend their being sown on prepared flannel; but, provided the materials used be of pure quality, we have learnt from experience that the simpler the operation the better, and that the use of either a piece of turfy loam, or in some cases a piece of fibrous peat, or, again, a mixture of both, perfectly free from fungus (brought about by decomposition of organic matter or of insects) is all that is required. To make sure that the materials used are perfectly free from all impurity and from living organisms, it is well to submit them to the process of baking in order to kill any germs of moss or other unwelcome growth which they may contain, and which may smother the young Ferns as they come up, and also to kill any slugs, worms, or insect larvæ which may be present. Another excellent way of getting rid of vegetable or animal life in the material used for sowing, especially when it is a mixture of the nature of ordinary Fern compost, consists in gently pouring the contents of a kettleful of boiling water over it, and allowing it to cool. In either case, when the soil thus treated has been allowed to cool and drain, it is ready for use, as eggs or larvæ of insects, spores of Fungi, &c., are all destroyed, and there is nothing left in the soil to interfere with the growth of the young Ferns.

When the sowing takes place on turfs of either peat or loam, these should be put in boiling water, and allowed to remain in it long enough to become perfectly saturated, after which they should be placed in an upright position, to allow all superfluous moisture to drain off. They are then ready to receive the spores, which should be scattered over them without any covering; being put under a bell-glass, they should remain there until the growth is sufficiently developed for pricking off, which is the next operation, and which will be described presently.

In case fibry loam is not procurable, it is best to sow in porous, shallow pans, or in pots which have been partly filled with crocks covered with a layer of either fibrous peat or sphagnum moss, the rest of the pan or pot being filled to within half an inch of the rim with a mixture of peat, loam, silver-sand, and soft brick broken very small; the surface may be rendered even by pressing it firmly with the bottom of another pot. This compost possesses a great advantage over all others, as it has been conclusively proved by many experiments undertaken by us, with a view to ascertaining to what extent the nature of the material employed has influence upon the germination of the spores, that while those of most species germinate on any material of a naturally moist nature, there are certain kinds which germinate only on either peat, crocks, or loam. When, therefore, it is not known positively which of these materials is the most suitable, the mixture above recommended gives the spores a fair chance of falling on the material for which they have a predilection; and we have frequently noticed that in pots thus filled the seedlings have been found most numerous on either peat or loam without any detriment to the young plants thus produced. The soil should be watered with boiling water, and allowed to drain; for watering after the sowing, even with cold water, may result in the total destruction of the spores. On account of their extreme minuteness, the spores should be simply dropped on the surface of the soil, and afterwards covered with a flat piece of glass. For the same reason, it is also necessary, while sowing, to hold the paper which contains them very close to the surface of the pots, as, being of so exceedingly light a nature, they are very liable to fly in all directions except in the one which they are desired to take.

The watering of the pots or pans in which Fern spores are sown is an operation of the utmost importance, and one which at all times requires great tact, as it has been demonstrated, when dealing with Fertilisation, that it is at a certain given time and through the agency of moisture, that the antherozoids fulfil their function, resulting in the fecundation of the spore. Until

the seedlings have formed a little crown, watering should always be done by partial immersion—that is, by allowing the lower part of the pots to stand in water till sufficient moisture has been absorbed—but the pots should not in any case remain altogether in water. To that effect, they should be stood in saucers, and disposed in places varying in temperature according to the nature of the species sown.

Beginning with British and other hardy kinds, we find that, although they germinate more rapidly, and also take less time in producing young characterised plants, when sown in heat, it is not at all necessary to have any artificially-heated place in which to sow and grow them. In their case, the pots or pans may be placed in some damp, shady, but not dark corner, out of the way—under the stage of a greenhouse, if such a place be available, is a good situation for them; and it is necessary to stand them on a piece of slate, or by other means to prevent the worms from getting in from below. There, without further attention, they should remain, until the surface of the pots or pans becomes covered with a growth of Lichen or Liverwort appearance; from this the young plants ultimately develop, according to the different species, in a space of time usually varying from three to six months from the time of sowing. A certain state of apparent dormancy, lasting sometimes several weeks, may be observed between the production of the scaly growth, and the sudden appearance, here and there, and eventually in a crowd, of the fronds proper, and it is during that period that the reproductive functions previously described take place; it is also principally during that time that, to encourage fertilisation, a uniform rate of moisture is of the greatest consequence.

When Fern spores germinate freely, and form a dense mass of prothalli, it is necessary, or even indispensable, that they should be several times divided —a delicate operation known as "pricking off," the effect of which is to give them room to develop themselves; for, if allowed to crowd and overgrow each other in the seed-pan, they are very liable to damp off. The "pricking off" consists in taking small tufts of prothalli, and putting them in pots filled with a material similar to the one in which they have been sown; but great care must be taken that no bruises result from that operation, and, on that account, small patches should be taken on a stick having the least notch cut in the end, and they should be merely deposited, not pressed, into the new soil, and about 1in. apart in all directions. After they have been pricked off, Fern seedlings should, for a few days, be treated very much as they were previously; they should still be watered by partial immersion, and no water should be applied overhead until the young plants have produced fronds. They should be gradually inured to the air by tilting on one side the glass cover, which may in a short time be removed altogether. Until then, it is best to keep the pots or pans at all times well shaded during sunshine, but not during dull weather. This is most effectually done by means of pieces of paper, which may be laid on the outside of the frame, and removed when not required. But when fronds have made their appearance, the seedlings will not require any other shading than that to which the house is usually subjected.

When the seedlings, provided with three or four rudimentary fronds, are sufficiently strong, they must be potted, at first three in a pot, then separately in small pots. On account of their tenderness it will be found necessary to place them in a somewhat close atmosphere, well shaded and carefully watered, where they should be kept until perfectly established, and where the air must be admitted gradually.

The foregoing details, though applying particularly to British and other hardy Ferns, form a mode of treatment which is equally applicable to the propagation of greenhouse and stove kinds, exception being made simply as regards the temperature to which they should be subjected, as they will fare all the better if sown in a close case in which a temperature of from 70deg. to 75deg. can be evenly maintained. Although Fern seedlings, when under suitable conditions, grow quickly during the spring and summer, it is impossible to state how long they will take to form little plants. Seedlings of such genera as *Adiantum*, *Pteris*, *Gymnogramme*, *Nephrodium*, &c., soon make little subjects requiring to be potted singly; whereas those of others, especially *Gleichenia* and *Marattia*, are of so very slow growth that we have known seedlings of the former to show their first fronds only the third year after the sowing took place.

There is another, and, to our mind, a most important, reason why Ferns, whenever practicable, should be propagated from spores: the interest attached to their being reproduced in that way is greatly increased by the chance thus afforded of finding something new, which cannot be obtained if the plants are propagated in any other way. Take, for instance, the brilliantly-coloured *Adiantum rhodophyllum*, which emerged from a batch of seedlings of *A. Victoriæ*, itself a freak of nature or a natural hybrid, found amongst a quantity of *A. Ghiesbreghti* (*scutum*) seedlings; or the equally graceful *A. Collisii*, a gigantic-growing kind in the way of *A. tenerum*, but with fronds finely divided, almost like those of *A. gracillimum*, a form selected from among a lot of seedlings of the common *A. cuneatum*. Many other forms of Maidenhairs, such as the crested *A. cuneatum grandiceps* and *A. c. Luddemannianum*, the drooping *A. Bausei* and *A. cuneatum deflexum*, the singular *A. Capillus-Veneris fissum* and *A. cuneatum Pacottii*, and a host of others, might also be mentioned here. Variations from seedlings, however, are not limited to that genus, for we have in *Nephrolepis Bausei* a most beautiful Fern, said to have originated amongst a batch of seedlings of *N. pluma*, from which it is totally different, and on which it may be considered a very decided improvement, being, in fact, a delicately plumose form. In Davallias we have at least two good home-produced forms—namely, *D. elegans polydactyla* and *D. Mariesii cristata*. By repeatedly sowing the delicate *Gymnogramme schizophylla*, the vigorous form known as *G. s. gloriosa* was obtained. Forms of our own native Ferns, too, raised from spores, are so numerous as to almost defy description. Again, we have endless varieties of *Pteris*—crested forms of *P. serrulata* and *P. cretica* of dwarf habit, such as *P. serrulata cristata compacta*, *P. s. c. Dixonii*, &c., as well as gigantic-growing varieties such as *P. s. cristata major* and *P. Ouvrardi*, the fronds of which frequently attain 4ft. in length. There is also the beautiful *P. cretica nobilis*, a lovely form of erect habit; but the most striking of all the known forms of *Pteris* is undoubtedly *P. tremula grandiceps*, a finely-crested seedling of *P. tremula*, in which not only are the bold and massive fronds terminated by a large and regularly-produced tassel, but every pinna has its extremities ornamented by a conspicuous and very pretty crest of smaller dimensions than the terminal one. Its habit is equal, and somewhat similar, to that of the popular species; its vigour is all that can be desired; and, as it reproduces itself in true characters, it will prove a striking illustration of what may be raised in the way of Ferns from spores, especially as *P. tremula* is apparently the least sportive species in the whole genus, and one which, until now, had not produced a single variation of any importance.

The above remarks naturally bring us to a subject which for some considerable time has given rise to much controversy, but which, owing to the better knowledge of the reproductive organs, and of their functions as bearing on the fecundation of the spore, is now admittedly beyond dispute. We refer to "Hybridisation." On account of the minute nature of the phenomena observable in fertilisation in Ferns, systematic hybridisation as in plants provided with flowers, and consequently with visible organs, may be at once discarded as impracticable. But the fact remains that the sowing of spores of several varieties together often results in offspring of mixed characteristics, proving that crossing really takes place. In several of the cases of the above-named garden hybrids, for instance, none of which are known for certain to be the result of forethought, a connection between the two parents is clearly shown; and this is still better exemplified in some of the results of intentional crosses produced by several of our British Fern growers. It is particularly the case with plants raised by Mr. Lowe, Mr. Clapham, Colonel Jones, and others, who have made this highly interesting operation a subject for special study, to which their untiring attentions have been devoted, with the results that Ferns are now produced, as examples of success in fertilisation, being crosses that possess characters combining those of specially fine varieties of which they are offspring. Among the most striking instances illustrative of satisfactory results in intentional crossing, that mentioned in Mr. Druery's book on "Choice British Ferns" (p. 44) as being Mr. Clapham's greatest success, and the result of a cross between a beautifully-crested Polypody (*Polypodium vulgare bifido-cristatum*) and a very finely-divided one (*P. elegantissimum*), is particularly remarkable and conclusive. In this case, the result is the transference not only of the characteristic cresting of the former to the latter, but also of its peculiarities to the otherwise normal fronds, which the latter is in the habit of producing occasionally—a feature which, of course, places the cross beyond a doubt.

It does not, however, follow that operations of this kind are always successful, and failure at a first experiment must not prevent another attempt. With a view to ascertaining the practicability of this mode of producing new forms, we personally undertook the sowing, on a very large scale, of spores of all the known species and varieties of *Osmunda*, considering that on account of the very distinct forms which it contains, that genus was the most appropriate for making such an experiment. There were sown together the crested form of our common Royal Fern (*Osmunda regalis cristata*) with the North American *O. cinnamomea*, as also with *O. Claytoniana* (*interrupta*). These, again, were sown together with *O. javanica*, different from all other known Osmundas through its evergreen nature and the coriaceous texture of its pinnate fronds ; with the slender North American form of *O. regalis*, called *gracilis* or *spectabilis ;* and with the crested Japanese form of *O. regalis*, called *japonica corymbifera.* These, we thought, might have produced, even if only a small percentage, offspring partaking to a greater or lesser degree of the character of both parents ; but, to our great disappointment, although several thousands of young plants were raised from these sowings, they simply reproduced one or the other of the parents, and not the slightest trace of variation was observable amongst them. The same thing happened in the cases of other genera, though, on account of the proceedings being less carefully booked, the trials were not of such importance as the one referred to above.

It is difficult, if not even impossible, to trace the parentage of such crested forms of Maidenhairs as *Adiantum cuneatum grandiceps* and *A. c. Luddemannianum*, or the deeply-laciniated *A. Capillus-Veneris fissum*, or, again, the drooping *A. Bausei* and *A. cuneatum deflexum ;* for there were existent no parents already possessing either crested, laciniated, or drooping characters, which could be transmitted to the offspring through fertilisation. The same remarks apply equally to the Davallias, two crested forms of which were raised about the same time as the above-named Maidenhairs, viz., *D. elegans polydactyla* and *D. Mariesii cristata*, one of which, at any rate, if not both, must have originated from parents with plain foliage. These, we should say, are natural sports or accidental variations in seedlings, which may possibly later on produce numerous varieties more or less crested, as is now the case with the almost endless forms of *Pteris serrulata.* It may be taken as a general rule that when the original form has once varied, it has a greater tendency to vary again. In that respect we have, as conclusive examples, the numerous forms of the Lady Fern, the Male Fern, the Hartstongue, &c., in which the tendency to variation is so developed that many distinct forms are generally found in any large batch of seedlings, while a small portion only reproduce the variety from which the spores have been gathered.

As illustrative of the above statements, it has been thought advisable to publish here as complete a list of garden hybrids, or supposed hybrids, already in existence, as could be made: the number goes on steadily increasing every year. Had it been possible, we would have given the names of the parents; but, although some forms apparently partake of the distinctive characters of two decided species already in cultivation, the production or procreation of the greatest number of them is too problematic, and their parentage, as at present known, is too uncertain, to warrant the advisability of such an undertaking.

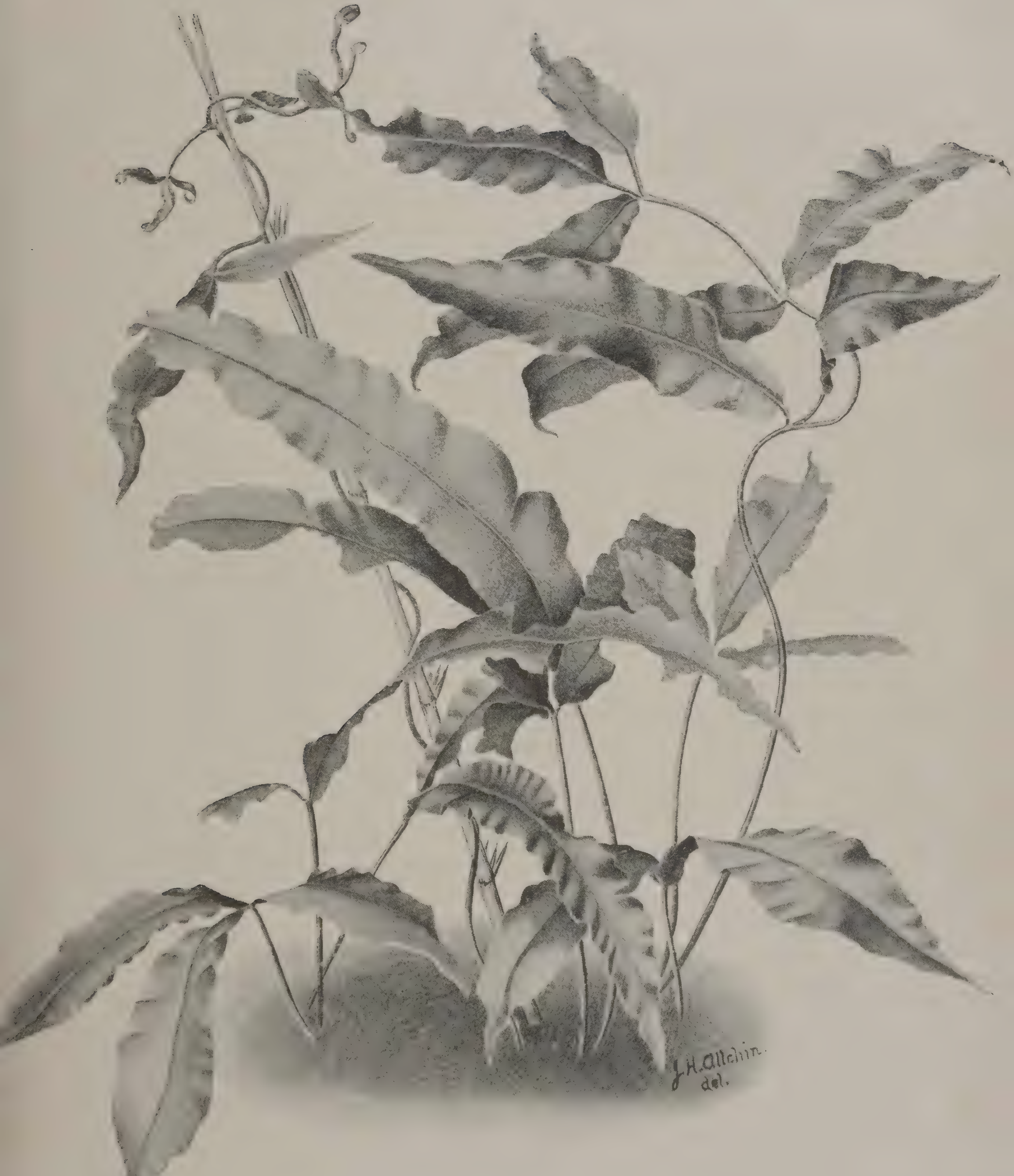
Besides endless garden and naturally-produced abnormal forms of *Aspidium* (*Polystichum*) *aculeatum angulare*, *Asplenium* (*Athyrium*) *Filix-fœmina*, *Nephrodium* (*Lastrea*) *Filix-mas*, *Polypodium*, *Scolopendrium*, and other hardy British Ferns, the following are all the varieties of garden origin at present known. The plants marked with an asterisk (*) require stove temperature: all the others thrive admirably under cool treatment. For stove and greenhouse temperatures, see page 27.

- Adiantum assimile cristatum.
    - Bausei.*
    - Birkenheadii.
    - Burnii.
    - Capillus-Veneris cornubiense.
    - C.-V. daphnites.
    - C.-V. digitatum.
    - C.-V. fissum.
    - C.-V. grande.
    - C.-V. imbricatum.
    - C.-V. Maraisii.
    - C.-V. obliquum.
    - Collisii.*
    - cuneatum Bournei.
    - c. deflexum.
    - c. dissectum.
    - c. elegans.
    - c. grandiceps.
    - c. gratum.
    - c. Lawsonianum.
    - c. Legrandii.
    - c. Luddemannianum.
    - c. mundulum.
- Adiantum cuneatum Owenii.
    - c. Pacottii.
    - c. strictum.
    - c. Waltonii.
    - Dadsii.
    - excisum multifidum (Leyii).
    - e. nanum.
    - Flemingii.*
    - Ghiesbreghtii (scutum).*
    - gracillimum.
    - Lathomii.*
    - reginæ.*
    - rhodophyllum.*
    - schizophyllum.*
    - versaillense.
    - Victoriæ.*
    - Weigandii.*
- Davallia elegans polydactyla.*
    - Mariesii cristata.
- Dicksonia Lathami.
- Doodia aspera monstrosa.
- Gymnogramme calomelanos chrysophylla Alstonii.*

- Gymnogramme calomelanos chrysophylla grandiceps.*
  - c. c. Laucheana.*
  - c. c. L. gigantea.*
  - c. c. Massonii.*
  - c. c. Parsonsii.*
  - c. decomposita.*
  - Pearcei robusta.*
  - pulchella Wettenhalliana.*
  - schizophylla gloriosa.*
- Lomaria gibba Bellii.
  - g. platyptera.
- Nephrodium molle corymbiferum.
  - patens cristatum.
  - setigerum (tenericaule) cristatum.
- Nephrolepis Bausei.
  - cordifolia compacta.
- Pteris cretica Mayii.
- Pteris cretica nobilis.
  - Ouvrardi.
  - serrulata cristata.
  - s. c. Applebyana.
  - s. c. compacta.
  - s. c. Dixonii.
  - s. c. lacerata.
  - s. c. major.
  - s. c. polydactyla.
  - s. Leyii.
  - tremula flaccida.
  - t. foliosa.
  - t. grandiceps.
- Todea grandipinnula.
  - intermedia.
  - plumosa.
- Woodwardia radicans Burgesiana.
  - r. cristata.

Propagation by spores is not always the quickest means employed for the reproduction of certain species. Filmy Ferns, for instance, are exceedingly slow in producing their first fronds, and *Hymenophyllum demissum nitens* and *H. pulcherrimum* have been known to remain five years in the prothallus state; from a small batch of spores of the Killarney Fern (*Trichomanes radicans*), sown in 1877, the results, in 1885, were only small plants, which, however, have grown rapidly since that date, their rhizomes starting and extending in all directions. Trichomanes and Hymenophyllums, therefore, must not be included amongst Ferns which are best propagated by spores: on the contrary, they increase more rapidly by means of division. Todeas, however, which belong to the same class, can only be propagated by spores. The stock of these lovely plants was only kept up by frequent importations until a comparatively recent date, when seedlings were freely raised by some of our leading nurserymen; but even in this instance the seedlings required several years of careful and constant nursing. Several striking varieties have also been produced among these; notably *Todea plumosa* and *T. grandipinnula*, both of which originated in Messrs. James Veitch and Sons' establishment. In their cases, as in those of many other garden hybrids, it is difficult indeed to trace the parentage, for these two varieties, as also some half-a-dozen less distinct in character, appeared amongst a batch of seedlings of *T. superba*. The most extraordinary fact in connection with these productions is the case of *T. grandipinnula*, which, though a Todea through the disposition of its spores and by the nature of its crown, has fronds greatly resembling those of a much-enlarged *Trichomanes radicans.* Another strange circumstance in connection with that extremely beautiful and most translucid of all known Todeas is that, soon after young plants of it had been sent out and distributed in Europe, several short, but evidently old, stems of a species in all respects similar to it were imported from Australia, under the name of *T. Moorei.* It is really impossible to account for such a freak of nature, the more so when we consider that, instead of a single subject being produced at the outset, a sufficient quantity of seedlings of *T. grandipinnula* were found at once to enable the raisers to put it in commerce.

If any further reasons in support of the practice of propagating Ferns from spores were required, no more conclusive proof of its excellence could be found than the fact that all our market growers raise them in that way. Their mode of procedure, however, is of the simplest description, and differs essentially from the one recommended above. This comes from the fact that the market grower's aim is not the formation of a collection, but simply the cultivation of showy sorts of rapid growth. He accordingly limits his culture to a few genera, such as *Adiantum*, *Pteris*, *Nephrodium*, *Aspidium*, and *Polypodium*, and even of these he only grows the most vigorous ; but this he does to perfection, and in an incredibly short time. His *modus operandi* is as follows : The spores of the different species, when ripe, are collected and sown broadcast on the surface of pots containing plants of slower growth, such as Palms, which, not often requiring fresh potting, gives the spores a fair chance of germinating and even of producing young plants. The latter are "pricked off" either in boxes or in pans ; thence, when they have made five or six fronds, they are taken and potted at once into 2½in. pots. In these pots, hundreds of thousands of Ferns are disposed of annually for the ornamentation of the dinner-table or of dwelling-rooms ; for such purposes more Ferns are grown in this country than any other kind of plants, and all of them are raised from spores. This mode of reproduction is also frequently resorted to for covering naturally damp, bare stone or brick walls, on which the spores of certain species germinate promptly, and the plants grow apace for a long time without any other nourishment than moisture, and what little vegetable mould is naturally produced by the decaying of their lower fronds.


J. H. Allchin. del.

Acrostichum scandens

(greatly reduced).

(*A*)

Propagating Ferns from spores is an exceedingly delicate operation, and one which, in its results, is sometimes discouraging, especially to the beginner who does not know, or does not fully realise, the advisability of keeping the spores very select, and apart from each other. It frequently happens that, instead of seedling Ferns appearing "as per note-book," other species take their places altogether. We have even known such instances to occur with spores collected from fronds kept separated from all others, when, notwithstanding this precaution, young plants which eventually were found to belong to other genera were present in such quantities as to greatly endanger the existence of those that were expected, which, however, appeared later on. The cause of such mishap is not far to seek: the spores being of so light a nature that they are carried away by the least breeze of wind, some, belonging to species particularly prolific, are naturally always in suspense in the air and in the water in the tanks, and many of them settle upon the fronds of all other kinds indiscriminately. These being, as a rule, spores of the commonest and most vigorous kinds, they germinate and develop much more rapidly than the others, which, in all probability, they would overgrow. The only way to avoid the consequences of this mishap is to gradually weed out, when quite young, those kinds which threaten to choke the sorts especially desired, and which, if the spores were good when sown, are invariably found under the spurious growth.

Besides the most natural way of propagating Ferns—from spores—it is sometimes found advisable, and in some cases is even necessary, to resort to one or other of the following methods of reproduction: (1) Division of the crowns; (2) "sectioning" of the rhizomes; (3) the rooting of proliferous or viviparous growths; and (4) the stimulation into growth of tubers found at the roots, or of latent buds situated at the base of the fronds, either on the stalk itself, or on the scales with which certain kinds are provided.

All Ferns which naturally form several crowns (and under careful culture and genial conditions there are many, especially among the British kinds, which partake of that character) may be propagated by division of these adventitious crowns, which are produced, sometimes from buds situated at the base of the stalks, and at other times by a process of fission in the crowns themselves. This mode of propagation is particularly applicable, amongst our native kinds, to the numerous and beautiful deciduous forms of the Lady

Fern, *Asplenium* (*Athyrium*) *Filix-fœmina*, and to those of the common Hartstongue, *Scolopendrium vulgare*, in which the duplication of the crowns takes place much more readily than in other generas. It is undoubtedly the safest mode of increasing most of the crested, tasselled, cruciated, congested, or depauperated forms of these species, the faithful reproduction from spores of the endless, and in some cases confusing, varieties being, at least, doubtful.

When Ferns are to be propagated by the division of the crown, it is necessary to allow sufficient time for its full development into two or more distinct centres of growth, when it will be found that each of these is provided with its own set of roots, and is really a perfect plant. In that case, by passing a sharp knife just between the crowns only—taking care, however, not to cut the roots—and afterwards pulling them apart, two or more young plants, which only require to be potted separately to form independent subjects, are produced. It is also deemed advisable sometimes to resort to that operation as a means of regulating the growth of the plants which are of less graceful appearance, when through the multiplicity of crowns a perfect crowd, developing in all directions, is produced. The most favourable time for the operation is from the middle of March to the middle of April, just before the plants start into fresh growth; the young subjects will then have plenty of time to thoroughly establish themselves during the ensuing season. If this mode of propagation is applied to British Ferns, they should, after the operation has been performed, be kept in a cold frame, as artificial heat is not in any way beneficial to them, and little or no water should be given until the first fronds make their appearance, which they generally do from ten to fifteen days after separation. When separating the crowns of exotic Ferns of evergreen nature, the divisions must, for a few weeks, be put under glass in a frame, to which air and light should be gradually admitted until the young plants are strong enough to stand outside the case. It will also be found advisable to subject to the same process such kinds as, for instance, the crested and other abnormal forms of the Male Fern, *Nephrodium* (*Lastrea*) *Filix-mas*, which are apt to develop several crowns, not by the process of fission, like the species above-named, but through the development of side buds. The removal of these buds is undoubtedly beneficial to the mother-plant, which then produces a more vigorous and more symmetrical growth, all its energies being concentrated in the development of its own growth. Like the divided crowns, the little plants produced from these buds are provided with a bunch of roots all ready to support the new subject as soon as it is severed from the mother-plant. These young plants are then best pricked out round the edges of pots or small pans filled with a compost of an open and somewhat sandy nature. For some reason or other, the edges of the pots and pans appear to be the most suitable places for young plants of all sorts, but particularly for young Ferns produced either from buds or from spores; this is possibly due to the permanent sweetness of the soil, which stimulates root action, through the circulation of a certain amount of air which does not easily penetrate any further into the compost.

Ferns provided with creeping rhizomes may generally be propagated freely by the "sectioning" of these organs, most of which bear cutting up into pieces, particularly while the plants are still at rest. It is thus that the Oak Fern (*Polypodium Dryopteris*), the Beech Fern (*P. Phegopteris*), the common Polypody (*P. vulgare*), and our native Maidenhair (*Adiantum Capillus-Veneris*), are usually propagated, as every piece of creeping rootstock bearing a couple of fronds and a few roots, or even rudiments of roots, usually produces a plant, when firmly pegged to the ground, with the rootlets well covered. Exotic Polypodiums, as also the majority of Davallias, numerous Acrostichums, &c., are easily increased by the layering of the points of their rhizomes; or if these are cut into various lengths, they rapidly produce lateral growths, which form independent little plants in a very short time. The best material in which to lay these pieces of rhizomes is one of very porous nature, in which a sufficient quantity of permanent moisture can easily be maintained without the compost ever becoming sour. Chopped sphagnum, rough fibrous peat, and coarse silver sand, in equal proportions, form the mixture which gives the most satisfactory results. In this the sectioned rhizomes should be laid with but a very superficial covering of the same material, through which the young growths will make their way in a remarkably short space of time, especially if the whole is subjected to the influence of a warm, moist atmosphere, such as that of an ordinary propagating-case, or of a melon- or forcing-pit.

In the case of viviparous or proliferous growths being produced on the foliage of either British or exotic Ferns, the mode of propagation is obvious; for, even when the plants possessing these characters can be reproduced from spores, the time gained by rooting the adventitious growths, as compared with the time taken by the complete development of seedlings, is sufficient to give the former process the preference. This mode of propagation is particularly applicable, among exotic Ferns, to several forms of *Asplenium bulbiferum*, most of which produce small bulbils all over the upper surface or at the extremity of their fronds; also to several members of the genus *Adiantum*, *Fadyenia prolifera*, *Cystopteris bulbifera*, *Scolopendrium* (*Camptosorus*) *rhizophyllum*, &c.: while, as regards British Ferns, it is restricted to several varieties of *Aspidium* (*Polystichum*) *aculeatum angulare* of the *proliferum* section, and to a few Scolopendriums. Several of the Aspidiums named develop buds in profusion on the surface of their stalks, and it is quite a common occurrence to see a mass of tiny young growths covering their midribs before the fronds decay altogether. As regards the Hartstongue, some forms produce buds on their stalks, as also on the surface and on the edges of their fronds; in the latter case it is necessary to cut a small portion of the frond to fix them in the soil, and to hold them until the roots have developed. Even in the plumose sections of the Lady Fern a few forms have been found occasionally producing on the back of their fronds bulbils from which young plants can be produced by pegging down. For all the above it is best to detach the young bulbils from the frond when they have three or four rudimentary fronds, and to prick them out in pans, or near the edges of pots, in an open compost similar to that recommended above for sectioned rhizomes.

We now come to a process of reproduction which is less generally known than any of those previously mentioned: it consists in assisting, or rather in artificially stimulating, the development of buds which, when left to themselves, usually remain dormant at the base of the stalks of the fronds of certain species. This is particularly applicable, among exotic kinds, to Angiopteris and Marattias, whose fronds are surrounded at their base by fleshy appendages, each provided with two buds, which seldom, if ever, develop when left on the plant, but which, on being placed in a compost of an open nature, and subjected to heat and moisture, never fail to produce handsome young plants. Among British kinds this peculiar process may be applied with advantage in the reproduction of some varieties of the Male Fern, of the Hartstongue, and even of some forms of the Lady Fern; for it has been found that the basal portions of the old, decayed fronds, which for many years retain some vitality, contain such latent buds, which usually develop when detached from the old fronds and treated in the same way as the scales of Marattias. As regards Scolopendriums, all may be readily increased by dividing the stool, or underground stem, with which every plant belonging to this genus, when sufficiently old, is provided. Cut up that portion which is below the ground into small fragments, lay these in a shallow pan half filled with crocks, and cover them with a thin layer of very sandy soil, which must be kept moderately, but also constantly, moist. In this way a crop of young plants, in all respects like the one from which the divisions have been obtained, will be secured. Although these will come up under cold treatment, the influence of a little artificial heat greatly assists the development of the young growth.

The small tubercles produced at the roots of certain Nephrolepis offer us another means of reproduction, and one which is most valuable in the propagation of such kinds as *N. pluma*, *N. Bausei*, &c., which, being of a deciduous nature, would otherwise have to be increased exclusively from spores. Their tubercles, which are produced in abundance, remain in the ground at rest fully three months after the foliage has died down—in November or December—and if the soil in the meantime is kept moderately moist, but not wet, these tubercles retain their vitality until the month of March, when, by being potted off singly, in small pots at first, they will, during the season, and with successive pottings, make very pretty young plants, similar to those produced from the stolons with which all tuberless and evergreen Nephrolepis are provided.

The foregoing modes of propagation may be resorted to with great advantage for the reproduction of species and varieties which, although fertile, cannot always be depended upon to reproduce true from spores, or, again, for accelerating the propagation of some of these fertile kinds. But there are cases in which the adoption of one or other of these methods becomes indispensable; for, however great the advantages derived from the propagation of Ferns from spores may be, there are some instances in which that mode of increase is practically impossible, as there are kinds permanently barren, or at least so far as plants subjected to cultivation are concerned. As a rule, we find this character most commonly shown in plumose forms of different species of British as well as of exotic origin. "Plumation," which may be considered as the most beautiful type of variation, consists in either a much more delicate division and growth of the ultimate sections of the frond than that of the common species, or in a greater foliaceous development. Ferns partaking of the plumose character are usually either partially or entirely barren, the reproductive vigour of the plant, exactly as is the case with flowering plants bearing double flowers, being apparently affected by the leafy development. It is now beyond dispute that if spores are not, or are only very sparingly, formed, the reproductive powers of these barren plants are much more developed in the production of buds on various parts of their fronds. Various and conscientious experiments have conclusively proved that the barren *Scolopendrium crispum*, for instance, is much more readily propagated from sections of the underground stem than the fertile varieties. Among the British Ferns naturally barren, the most striking instance is that of the beautiful Welsh Polypody (*Polypodium vulgare cambricum*), which, although grown in great quantities, and consequently under very different circumstances, and subjected to various climatic conditions and influences, has never, to our knowledge, been seen bearing any fertile fronds, either in its natural habitat or under cultivation. The characteristic of permanent barrenness is equally well illustrated in the case of the lovely frilled or plumose form of the common Hartstongue, *Scolopendrium vulgare crispum*, which, although grown in enormous quantities and under various conditions, has invariably refrained from producing spores. There is, it is true, a form called *S. vulgare crispum fertile*, but it is a totally different plant from the above, its plumose character being a great deal less prominent than in the variety *crispum*. The same comparative distinctions, as regards fertility in relation to "plumation," are exemplified to a similar degree in Moore's very plumose form of the Lady Fern, which very seldom produces any spores, and in Axminster's form of the same species, which is less plumose, and is generally fertile. We have, year after year, carefully examined the fronds of plants of Moore's variety growing under totally different conditions, the result of our researches being that sometimes, but very rarely indeed, a very limited number of spore-cases or sori were found—not in sufficient quantity in any case to ensure the propagation of that lovely variety exclusively from spores. The same remarks apply also to *Aspidium* (*Polystichum*) *aculeatum angulare plumosum*, which partakes of the barren character to an exactly similar degree. If a few spore-cases are produced, they are generally found, upon close inspection, to be abortive. This absence of spores sufficiently explains the rarity of these lovely Ferns in our collections, as well as the comparatively high figures at which they are quoted in Fern catalogues. Their propagation is necessarily a very slow process, particularly that of the plumose form of *Aspidium* (*Polystichum*) *aculeatum;* this can only be increased by means of side growths, which are but sparingly produced at the base of the protracted trunk, and only after the plant has already attained a certain age. The barren forms of *Polypodium* and of *Scolopendrium* are more plentiful in collections, for this reason—that while, in the cases just described, one must patiently wait for the production of the offsets or of side buds, these species and their varieties may be—and, indeed, frequently are—propagated either by the sectioning of the underground stems, as previously explained, or by the division of the crowns, which are produced in greater abundance.

Among exotic Ferns, we find the same barren character affecting to a similar degree the plumose forms of different species. A popular illustration of this character is undoubtedly the beautiful *Adiantum tenerum Farleyense*, or, as it is commonly called, *A. Farleyense*, which according to some authors should be a plumose or much-enlarged form of *A. tenerum*, and according to others one of *A. Ghiesbreghti* (*scutum*). This latter theory, however, can hardly be maintained, as *A. Ghiesbreghti* is known to be itself a variety of *A. tenerum*, having originated some years since in Mr. Williams' nursery, whereas *A. tenerum Farleyense* is certainly not of British garden origin. Whatever its pedigree may be, this really beautiful Fern, which is sometimes, and very appropriately, called "The Queen of the Maidenhairs," was first discovered on Farley Hills, in Barbados, by the late Mr. T. C. Daniel, of Stoodleigh, near Tiverton, who sent the original plant to England, and from this one plant all those afterwards propagated were produced by the division of the crowns; none appear to have ever been raised from spores, which from time to time we have heard of as existing in various places, but have never seen. As it has just been stated, *A. tenerum Farleyense* is exclusively increased by division, and it is found more profitable to repeatedly divide small plants than to cut up large specimens, divisions of which take a much longer time to form shapely plants. As is the case with most stove Ferns of evergreen nature, this may be safely divided at all times of the year, provided the divisions can, for five or six weeks, be kept in a warm, close place; but it is, nevertheless, best to perform the operation when possible between March and August.

We have in *Nephrolepis Duffii* another beautiful and distinct, entirely barren Fern, a native of the Duke of York's Islands, in the South Pacific. Its mode of growth and its general appearance are so very unlike any other member of the same genus that it is impossible to determine of which species this may be a variety. Its fronds, which are densely crowded, grow from 15in. to 20in. in length, and are slightly or heavily crested according to the temperature to which it is subjected: the higher the temperature, the larger the crests. The pinnæ (which are small and produced in pairs, one overlapping the other, those above being the largest) present an arrangement entirely different from that observed in any other Nephrolepis. Their predominant form is semicircular, and they are all slightly toothed at the edges. The compact, elegant habit of this Fern, and its bright colour, coupled with excellent lasting qualities, render it a desirable plant for house decoration. Its propagation is comparatively easy and rapid, as it produces in abundance stolons from which young plants spring up in all directions. The same may also be said of the Fijian *N. rufescens tripinnatifida*, undoubtedly the most beautiful of all the strong-growing kinds in cultivation. The fronds of this exceptionally fine, plumose, and, consequently, totally barren Fern, which reach quite 3ft. in length, are of a lovely light green colour, and possess a particularly massive yet feathery appearance, produced by the broad pinnæ being regularly and constantly tripinnatifid, their margins being on both sides deeply cleft, and covering each other in a most graceful and effective manner. Being, like all other Nephrolepis, provided with numerous stolons, this variety is readily propagated by the same means as is employed for *N. Duffii* and *N. davallioides furcans*, which consists in planting them in a bed made of rough fibrous peat, chopped sphagnum, and coarse silver sand, in about equal proportions. In this compost the stolons should be allowed to run freely, and they should be pegged down firmly as soon as they have attained 6in. in length; upon these young plants will develop and root freely, and can then be taken up without difficulty and put into single pots. This is by far the best way of increasing all Ferns provided with proliferous stolons, and all Nephrolepis, whether fertile or barren, can with advantage be propagated in this way.

Lomaria discolor bipinnatifida is another rare and beautiful barren Fern, of Australian origin, and one of the most elegant of its genus for decorative purposes. It is a plumose form of the sub-arborescent *L. discolor*, to which it bears the same relation as *Polypodium vulgare cambricum* does towards *P. vulgare.* Like those of the species to which this remarkable variety is related, its fronds, which are produced in abundance, spring from the crown of a short, robust stem; they measure from 1½ft. to 2ft. in length, and have a peculiar arching habit, doubtless produced by the weight of the leafy portion, which, instead of being simply pinnate, like those of all other Lomarias, has the pinnæ very closely set, so as to overlap each other. This variety produces only pseudo-fertile fronds, which have all the appearance of fructification, but which never contain any spores: it consequently remains comparatively scarce. To reproduce it, suckers have to be resorted to: these are very sparingly produced from the base of the trunk, and generally below the surface of the ground. By being taken off, when provided with three or four fronds, but not before, and potted in a light compost containing a little decayed sphagnum, the suckers soon produce young plants, which, when established, grow rapidly.

The superb *Gymnogramme Pearcei robusta*, which is a vigorous-growing form of the elegant but very delicate *G. Pearcei* of Peruvian origin, is another permanently barren Fern, illustrative of the theory that when a plant does not produce seeds its reproductive powers are enhanced in other ways. The original *G. Pearcei* generally, if not exclusively, produces but a single crown; but this very interesting variety has a tuft of crowns at the apex of the short caudex, from which many stipes arise, giving the plant a denser habit, and the appearance of being better furnished, than the original type. This multiplicity of crowns is the exception among Gymnogrammes, and furnishes us with the only means of propagation applicable to this particular variety, whose tall, triangular, bright green fronds are nearly as finely cut as those of the species from which it is a seedling, but in other respects it is larger in all its parts, much more robust, and of much freer growth.

Accidentally or occasionally, fertile Ferns are found amongst exotic as well as amongst British kinds, and that partial character again is mostly restricted to plumose forms of species naturally provided with plain foliage. We will only give as illustrations three of the forms most striking, on account of their beauty and their value as decorative plants. First comes the magnificent plumose form of *Pteris serrulata cristata* known, on account of its origin, as the "Chiswick" variety, but usually sold in the trade under the name of *P. serrulata cristata major.* This splendid variety forms plants 4ft. high, and as much through; its fronds, rendered beautifully pendulous and elegant through the weight of their crests, are usually apparently fertile; but, although spores appear to be present in abundance, we very rarely hear of any seedlings of it being raised, and we must confess that, although carefully-selected spores of it have been repeatedly sown by us for the last fifteen years, we have never raised a single plant equal in habit and in vigour to the original subject, the propagation of which is exclusively effected by means of division of the crowns. In *Davallia* (*Microlepia*) *hirta cristata* we have a plumose and gigantic crested form from the New Hebrides, in the South Pacific, partaking of the barren character to about the same degree as the Pteris above mentioned. It is a grand plant, with the spreading habit of the normal form, from which it materially differs in having its handsome, feathery fronds, frequently 4ft. long, heavily tasselled at their extremities, and the rachides of the pinnæ branched and subdivided at their ends. On account of the few seedlings raised from spores produced accidentally being very variable, the propagation of this remarkable plant is generally effected by the division of the crowns—an operation which may be performed with safety at any time of the year, as the plant is in active growth in all seasons. *Davallia fijiensis*, an evergreen plumose form of Haresfoot of comparatively recent introduction, is the last Fern which we shall mention as partaking of the character of occasional fertility: it has been casually known to produce spores, but there is no existing record of any young plants having been raised from these. Its finely-divided and beautifully glossy fronds, which grow from 2ft. to 3ft. in height, are compoundly divided, the whole of them being split up into lanceolate pinnules of a firm and durable texture and bright green colour. These are abundantly produced from creeping rhizomes, which exhibit a great dislike to being kept underground. Its propagation, therefore, though somewhat slow, is comparatively easy, as every piece of rhizome, with a frond or two attached to it, and provided with rudimentary roots, will, by being detached and kept close for the space of a few weeks, produce young plants in all respects like the parent.

Besides the kinds above enumerated, there are some other Ferns, British and exotic, partaking to a certain extent of the barren, or of the accidentally fertile, characters; but the instances given above have been thought sufficiently numerous to show that these characters are shared principally, if not even exclusively, by plumose forms in both sections, and that reproduction from spores, however advisable in many respects as a general operation, becomes, in such peculiar cases, absolutely impossible.

Lately we have had to record two other modes of propagation, each of them very little known to the public in general, but which may be classed among the most important discoveries of recent date bearing on the reproduction of Ferns, and through both of which the young Fern is produced independently of the phenomena described in the part of this chapter devoted to propagation from spores. One has been called Apogamy (from *apo*, afar, and *gamos*, marriage), and the other Apospory (from *apo*, afar, and *spora*, a spore or seed). In the former process, Apogamy, which was first observed by Professor Farlow in connection with the well-known *Pteris cretica*, but which is now known to affect several other Ferns, notably *Nephrodium* (*Lastrea*) *Filix-mas cristata*, the young Fern is produced as a bud from certain parts of the prothallus, without the formation of sexual organs. The sexual process, as the name indicates, is in this case completely abolished, the production of spores being suppressed.

In the other departure, Apospory, which has been brought prominently before the public by Mr. Charles T. Druery—who, in a series of most interesting lectures upon the subject before the Linnean Society, stated that in certain Ferns the prothalli are produced as outgrowths from the pinnules of the Fern fronds, and not from the spores—the sexual reproduction is not affected, and the leafy Ferns are developed from the prothalli in the usual way. But the prothallus, according to the variety in which Apospory was observed, is either modified sporangia or simply a structure of prothalloid nature, without any connection with sori or sporangia. Thus it is that Professor Bower, who made careful and very elaborate investigations of these new modes of reproduction, states that in *Asplenium* (*Athyrium*) *Filix-fœmina Clarissima*—the first plant on which this singular character was observed—the prothalli are modified sporangia; whereas in *Aspidium* (*Polystichum*) *aculeatum angulare pulcherrimum*, in which the same character was first discovered by Mr. G. B.

Wollaston, no traces of sporangia can ever be detected. We particularly mention these two varieties as being those on which the most interesting experiments made by Mr. Druery and by Mr. Wollaston were based. The welfare of these plants is of the utmost interest to us, on account of several specimens of *Asplenium Filix-fœmina Clarissima*, which were presented to us by Col. Jones personally, being still in our possession. But either through their not being sufficiently developed, or through their being cultivated out of doors under unfavourable circumstances, these do not appear to share the character of their parent; and, although we have never succeeded in raising seedlings from any of them, we have equally, up to the present time, been unable to detect on them any traces of Apospory. The original plant of this beautiful and exceedingly interesting form was bought by Col. Jones, of Clifton, from Mr. Moule, who found it in a wild state in North Devon. Considering how easily most of the varieties of the Lady Fern are raised from spores, it was thought very remarkable that failure should follow upon failure in attempts at its reproduction from what were supposed to be, and what had all the appearances of, spores. It was at last decided to treat the peculiar growths produced by that Fern as merely abortive spore-cases which, like those of some other abnormal forms, were produced by this one, lacking the special vigour necessary for the formation of perfect reproductive spores. All attempts at raising it from spores having proved abortive, further trials were abandoned until, later on, Mr. Druery having discovered upon another form of the Lady Fern (*A. F.-f. plumosum divaricatum*) numerous proliferous bulbils occupying the place of the sori on the back of the fronds, and having reported the fact to Mr. Wollaston, this latter gentleman was led to re-examine *A. F.-f. Clarissima*, as the Fern had been named by Col. Jones. As the results of his examinations, Mr. Wollaston came to the conclusion that these so-far barren excrescences might be viviparous growths of a kindred nature, and capable of reproducing the parent form by direct bud-development. Later on, Mr. Druery found, upon microscopical examination of a portion of a frond sent him, that "there were material structural differences between the unmistakable bulbils of *A. F.-f. divaricatum* and the singular growths found upon *A. F.-f. Clarissima*, the former being solitary, bud-like growths, seated in the centre of a number of brown, lanceolate scales, and without a trace of indusium;

while the latter were composed of five or six or more flask-shaped bodies, each one larger than the bulbils aforesaid, and seated within an undoubted indusium."

In Fig. 10, A represents the pear-shaped, bulbil-like growths which were previously referred to as flask-shaped bodies or excrescences attached firmly to the frond by their thicker extremities, and seated within indusia in every case; these were observed in 1883. With a view to ascertaining their reproductive capabilities, Mr. C. T. Druery undertook a series of experiments, commencing by layering edgewise some of the pinnæ in prepared pans, and embedding them half-way into the soil, thus bringing the growth into immediate contact with it. Then placing the pan in gentle heat, he had the satisfaction of seeing these growths increase in size, and develop in such a way that the said experiments culminated in the production of young plants of the same type as the parent. These originated from archegonia and antheridia eventually developed on prothalli which themselves had their origin on the points of the pear-shaped pseudo-bulbils. In the following year (1884) Mr. Druery brought before the notice of the Linnean Society pinnæ showing this singular mode of fructification, which, owing partly, he believed, to a long, dry summer, and partly to the fact that the parent plant was placed out of doors for a time, was in an immature state, yet afforded ample evidence of abnormality. This is represented at B, Fig. 10, where it will be noticed that, by lifting the indusium of the pinnæ, a number of curious, club-shaped, and occasionally serpentine, cellular masses are partially disclosed, which, though very different from the swollen, pear-shaped bodies of the previous year (see A, Fig. 10), differ just as widely from embryo sori. Later on Mr. Druery ascertained that Mr. Mapplebeck had already observed the same phenomenon, and had raised plants from similar bulbils, which appeared identical in position and character with those of *Asplenium*, of which *Athyrium* forms a very important section.

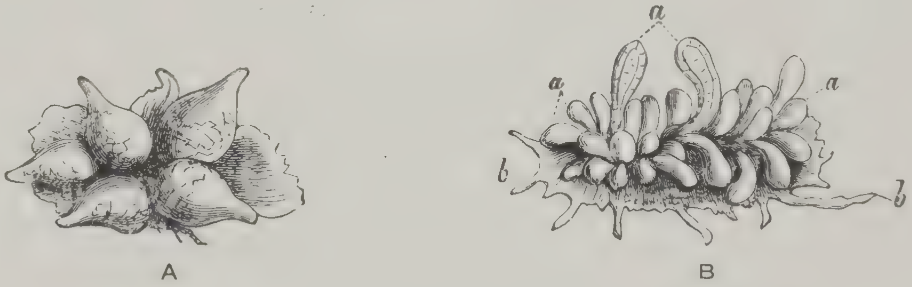


Fig. 10. Apospory.—Abnormal Reproduction of Asplenium (Filix-fœmina Clarissima.

A—Pyriform Pseudo-bulbils or Abnormal Sporoid Growths of 1883 (magnified). B—*a*, *a*, *a*, Clavate Abnormal Sporoid Growths of 1884; *b*, *b*, Ragged Indusium—magnified.

Finally, we extract from a paper by Professor Bower with reference to Mr. Druery's observation, which was read at the Linnean Society's meeting on the 18th December, 1884, the still more interesting example of Apospory of which Mr. G. B. Wollaston is the discoverer, and which bears on the plant already mentioned, *Aspidium* (*Polystichum*) *aculeatum angulare pulcherrimum.* "Here," Professor Bower says, "flattened organs, of undoubted prothalloid nature, are formed by simple vegetative outgrowth of the tips of the pinnules, and without any connection with sori or sporangia. At first the tip of the pinnule merely extends, so as to form a flattened expansion, one layer of cells in thickness, and with a very irregular margin; while the whole tip curves downwards, and often forms a spiral coil of one or one and a-half turns, closely covered above by the more expanded portion of the pinnule. In other cases the outgrowth may assume very irregular forms. Ultimately the characteristic marginal growth begins at some point, sometimes terminal, but more frequently lateral," &c. This latter instance, being an example of the formation of an expansion of undoubted prothalloid nature, bearing sexual organs, by a process of purely vegetative outgrowth from the plant, may be considered as a still more complete example of Apospory than even that of *Asplenium Filix-fœmina Clarissima.*

From the preceding remarks, which have been derived from Mr. Druery's excellent work on "Choice British Ferns," in which the process of Apospory is very minutely described, and to which the reader may refer for more detailed particulars, it will be seen that no less than three distinct forms of proliferation have now been observed in the *Athyrium* section of the genus *Asplenium:*

(1) Bulbils of the ordinary character, developed in the axils and on the superior surface of the pinnæ, and agreeing in general characters with the ordinary bulbils of *Asplenium.*

(2) Bulbils formed apparently by transmuted spore-producing energy, and occupying the place of sori, *i.e.*, on the under-side of the pinnæ—a position until now, we believe, quite unrecorded in connection with any of the *Filices.*

(3) A new form of proliferation altogether, viz., proliferous prothalli arising from pseudo-bulbils produced by a different transmutation of the reproductive force, and evolving plants only after the prothalli have produced the usual sexual organs common to prothalli resulting from spores.

These, so far as is at present known, constitute the whole series of means of reproduction in Ferns, some of which, as has been pointed out, are more applicable to certain sorts than to others, but all of which yield satisfactory results if properly carried out.

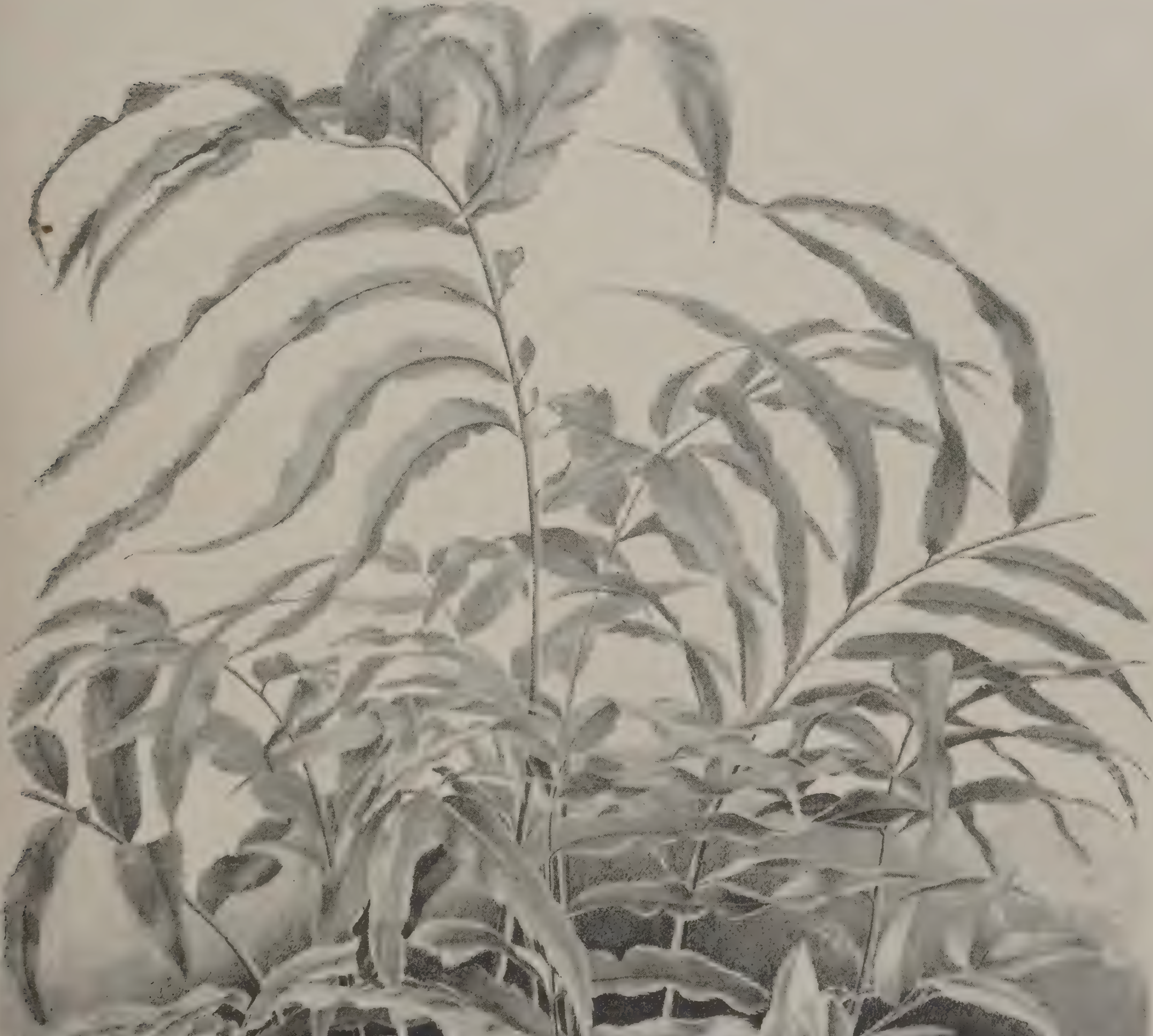
To those persons who are anxious to raise varieties distinct from kinds already known in cultivation, we would point out that, so far as the production, either accidentally or methodically, of new forms is concerned, the sowing of spores is the only means which can be depended upon; for it will be seen from what has been said regarding the other modes of propagation, that these constitute means of *reproduction* only, the subjects thus obtained being in all respects, and without any recorded exception, similar to the plants (either species or varieties) to which they owe their existence.

CHAPTER XV.

CULTURAL DIRECTIONS.

ALTHOUGH it frequently happens that the conditions under which plants grow spontaneously cannot be artificially produced, the knowledge of the positions in which they grow naturally is of the utmost importance in the successful cultivation of all plants, to whatever family they may belong. With the exception of a few kinds which really prefer exposed and airy situations, it may be safely stated that the majority of Ferns are generally found forming a sort of undergrowth in woods and forests, or clinging to the sides of rocks, or again growing by the sides of brooks and rivulets, but almost always under trees, which not only afford them protection from the hot rays of the sun, but also shelter them from the violence of strong winds. In these situations they luxuriate to such an extent that when the same kinds are found growing accidentally in places exposed to the direct action of the elements, they are difficult to identify. Whether Ferns are cultivated in pots or in the open ground, these natural conditions should, as much as possible, be imitated. The hardy Fernery should therefore be situated, whenever practicable, in a naturally moist and cool spot, and, strong light being in most cases objectionable, the neighbourhood of tall deciduous trees should have preference over all other places.

As regards Ferns requiring glass protection, it should be borne in mind that, with few exceptions, exotic as well as hardy kinds love moisture and shade. On that account the houses in which they are grown should, whenever possible, be disposed from north to south, so as to avoid the strong rays of midday sun, while at the same time retaining all the light possible.



Acrostichum scandens

(¼ nat. size).

(*B*)

Exception to this rule should be made in favour of structures intended for the cultivation of Filmy Ferns—Todeas, Trichomanes, and Hymenophyllums—all of which thrive best when grown in a house with a north aspect and subdued light. The exotic Fernery should also be a little below the level of the ground: this disposition will ensure uniformity of temperature and permanency of moisture, both conditions most beneficial, but very difficult to obtain in houses built above ground, especially when, as is generally the case, these structures are supplied with shelves and open stages. Where a naturally shaded spot cannot conveniently be found in which to erect the Fernery, shading is at times indispensable, but it should only be afforded with a view to preventing the scorching of the fronds, by breaking the rays of the sun, and not to keeping out all natural light. In this case it is preferable to shade by means of movable blinds, made of coarse canvas or of other suitable material, which should be of a nature sufficiently open to admit plenty of light. The blinds should be let down for a few hours, according to the situation of the Fernery, when the sun is strong, but should be drawn up again as soon as there is no danger of burning; for it is unwise to weaken the substance of the fronds by subjecting the plants to the influence of permanent artificial shade. Although most Ferns are naturally adverse to strong light, it is now acknowledged that, in the construction of a Fernery, the use of ground or plate glass for roof glazing should be avoided. Numerous experiments have been tried with the object of dispensing with shading when ground glass had been selected as the best means of producing an even and diffuse light, but its use in most cases, if not in all, has had to be abandoned. The shading of the Fernery by blinds may, however, be successfully obviated by the use of green-tinted glass, as in the Fern-houses in Kew Gardens, where, in spite of all that has been said and written to the contrary, it gives perfect satisfaction.

The foregoing remarks apply exclusively to the external parts of the Fernery. The organisation of the internal parts is a matter of no less importance, and to give the subject as fair a share of attention as it really deserves it is proposed here to divide the particulars into two sections. It is therefore necessary to deal first with the Fernery as it is understood by nurserymen and market growers, as also by gardeners and others requiring Ferns to be grown either for sale or for the sake of supplying decorative plants for the room, and where, on that account, these plants must necessarily be grown in pots. In the second part, special attention will be devoted to the arrangement of the Fernery in a natural style, such as should exist in every amateur's garden, even where these plants are largely grown for the special purpose of frond-gathering; for the supply yielded by Ferns planted out far exceeds that produced by plants in pots, even under the most favourable conditions.

The houses in which Ferns are intended to be grown in pots should be low structures, sunk at least 1½ft. or 2ft. below the surface of the ground, and provided with solid beds bricked on their vertical outer surface. The walks should be made either of coarse gravel or of the natural earth, simply covered with a thickness of a couple of inches of coal cinders, these being the most porous and yet the best moisture-retaining materials that can be used in a house in which constant humidity is of the utmost importance. Wherever Ferns are grown in pots it will be found essential that these should stand on a solid, cool, moist bottom, and the stage or the shelf can hardly correspond to the requirements of the plants. It may, therefore, not be out of place to remark here that the most suitable material on which to place Ferns in general is a solid bed of ashes, or one of sand covered with a layer of coal cinders, which have the property of remaining perfectly sweet and fresh for an indefinite time. The ventilation of such a house should be managed so that a free and constant supply of fresh air may be admitted without creating a regular draught, which itself is extremely injurious to nearly all plants, but most particularly to Ferns of all kinds. It is, however, questionable whether a close, stuffy atmosphere is not more injurious to Ferns than an excess of ventilation. If the Fernery is a cool structure specially devoted to Japanese, New Zealand, Australian, and evergreen British kinds, and in which the temperature during winter is only kept a little above freezing-point, then ventilation from the roof is quite sufficient. When, however, we have to deal with the house in which warm exotic kinds, such as South American and East and West Indian species are grown, it is advisable, besides the top ventilation, to have also ventilators along the sides of the house. These should be disposed a little below the level of the hot-water pipes, so that the air which, before escaping through the top ventilators, passes over and amongst the plants, should only do so after having been slightly warmed by its temporary contact with the hot-water pipes.

Ferns in Pots.

Ferns grown in pots require fresh potting more or less frequently, according to their size and also to their power of growth, but in any case it is advisable to avoid over-potting. It is well known among practical men that these plants make their hardiest and most luxuriant growth when the inside surface of their pots is already covered with a network of their roots. These organs, in the majority of cases, are of a fibrous nature, and exceedingly sensitive to even a temporary absence of moisture, which occurrence should always be carefully avoided, as the results are generally very disastrous in their effects. When a Fern has suffered from want of water at the roots, the effect is shown by the shrivelling of the fronds, the older ones being usually affected before the young growths. This peculiarity in Ferns is very misleading, especially with persons not particularly well versed in their culture; for while in the case of most other plants, either of herbaceous or of woody texture, the temporary flagging of the foliage is efficiently remedied by an ordinary watering, or, at the most, by a thorough soaking of the roots, such treatment has no apparent effect on the roots of most Ferns, and very few indeed are the species whose fronds, having once flagged, regain their elasticity by the application of water at the roots.

When proper attention is given to Ferns after repotting, this operation may safely be performed at almost any time of the year ; but it is best, speaking generally, to commence in the warm-house about the beginning of February, and in the cool-house about the beginning of March. In every case, it is most advisable to have the plants repotted before their starting into new growth. Old pots, when used, should be clean and dry : although the plants may grow, and even luxuriate, in pots which have been used either wet or dirty, they cannot fail to greatly suffer when they next require repotting, as it will then invariably be found impossible to remove them from the old pots without breaking a quantity of live roots, which will be found to strongly adhere to their sides. Previously to their being used for Ferns, new pots should also be put in water, in which they should remain a sufficiently long time to get thoroughly soaked, and then be well dried before using : it is notorious that pots fresh from the kiln absorb a great quantity of water, and when their pores are not previously filled, it very frequently happens that the first two or three waterings, instead of being beneficial to the plants, only serve to soak the pots, while the balls of soil which the latter contain become so dry that it is often most difficult afterwards to get them into a satisfactorily moist condition.

When we consider that nearly all Ferns require to have their roots kept at least moist at all times of the year, it will be readily understood that the question of drainage is also one of the utmost importance; for it is now generally admitted that, compared with the process of watering and the production of proper atmospheric moisture and temperature, the question of soil is one of only secondary consideration. If Ferns suffer seriously from drought, the presence of water-logged soil is quite as pernicious and destructive in its effects. When repotting Ferns, it should be remembered that by far the greater number of them grow naturally in partly-decayed vegetable matter, usually of a soft nature: they should therefore be made firm in their pots, but on no account should they be potted hard. Formerly a large proportion of peat was used in the cultivation of Ferns, as it is to this day on the Continent; but we have of late become better acquainted with their requirements, and the superior qualities of leaf-mould have been held as of considerable advantage to these plants. A compost of an open nature, through which the water may readily pass, and which also favours a change of air in the soil (so beneficial to the roots), consists of a mixture of two parts of sandy loam, such as the kind in which the common Bracken is generally found to luxuriate, with one part of leaf-mould, one part of fibrous peat, and one part of coarse sand. This compost may be given as the one possessing all the qualities required by the majority of Ferns; it makes a very open, porous material, in which most kinds will thrive. In any case where a particular treatment is required, this will be given with the description of the species.

The Natural Fernery.

Although Ferns are naturally a highly-interesting class of plants when each species is taken individually, their beauty is greatly increased by judicious disposition in massing them together; and the natural Fernery, taken either as a warm or as a cool structure, or even as an outdoor rockery, is the place most likely to produce satisfactory results in their cultivation. In Ferneries such as these, in which all specimens, large or small growers, are planted out without any regard to regularity and symmetry, where they are allowed, so to speak, to run wild, and by such means to simulate as much as possible natural growth, each plant has the advantage of showing to a greater perfection its peculiar characters. It is when under such conditions that, through the intermixing of plants possessing broad and bold foliage with others of totally different characters, a most pleasing contrast is produced, and masses of vegetation remarkable for picturesque beauty are most effectively formed.

The formation of striking contrasts should be an object always kept in view. Combinations of this sort can easily be effected by a judicious selection of species of either totally different habits or distinct forms and colours. The variety of tints observed in many Ferns is of the greatest value, and should be carefully studied in the plantation of a natural Fernery, as it affords ample and ready means for the production of very effective arrangements. In grouping Ferns, symmetry should in all cases be carefully avoided, for their being disposed in a formal manner does not add to their natural beauty. Overcrowding is another evil which should be strictly avoided, as, when planted thickly together, individuality is lost, and that is a point which, at the time of planting, should receive special attention. Another advantage in connection with the natural Fernery is that Ferns planted in rockwork require a great deal less attention than those grown in pots, and if provided with suitable soil at the outset they will, with the help of an occasional surfacing, flourish for years, and attain a size considerably larger than when grown in pots.

The successful building and planting of the natural Fernery either as a cool or as a warm structure being dependent on similar principles, and requiring the same attention, it is proposed here to treat the two simultaneously. In previous chapters attention has been called to the kinds adapted to each structure.

In the building of a natural Fernery the principal object is to secure, as far as practicable, an equal amount of light for all the plants. It is necessary, for the welfare of all subjects, that those planted at the lower part should receive as much light as those on the higher part of the rockery, for the foliage of the plants situated in the lower parts should be quite as fresh as that of the plants above, and this luxuriance should reach to the very margins of the walks; such results can only be attained by the free admission of light in all parts of the Fernery at all times of the year, but especially during the winter months, when we can hardly get a quantity sufficient for the requirements of all evergreen species.

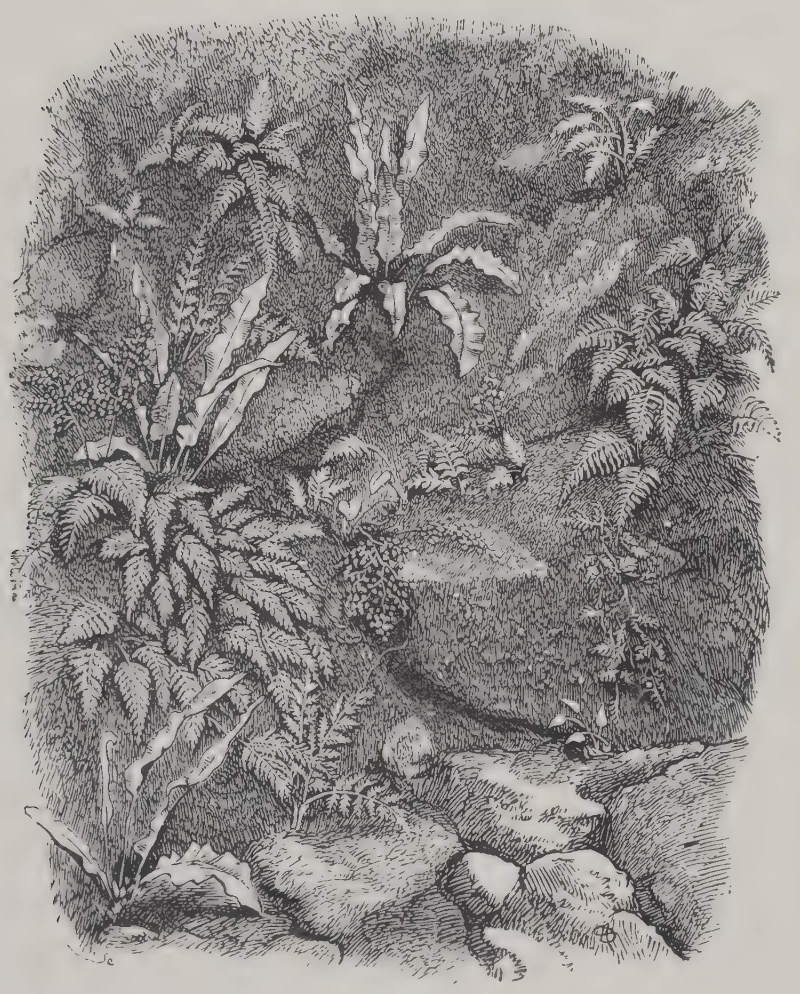


Fig. 11. View of Underground Fernery.

The grottoes, as well as the arches and masses of overhanging rock, which one is so accustomed to see in most Ferneries, should be carefully dispensed with; for, however attractive the effect may be, it is invariably spoilt by the sickly appearance of the Ferns planted in nooks which are perforce deprived of the necessary light. A view of an underground Fernery in which there are no overhanging rocks, is shown at Fig. 11. Tufa not only has a pleasant appearance, but is also, through its very porous nature, the material best adapted for the building of Ferneries. The comfort of the plants should be considered of primary importance, and must on no account be sacrificed to the appearance of the rockwork itself, as is too frequently the case nowadays. For the well-being of the Ferns, quite as much as for the sake of the general appearance of the place, these should be planted on the sloping sides and on some little mounds made of turfy peat securely held together by means of wooden skewers, and covered with a layer of common moss, which at first requires pegging down, but which in such a position rapidly grows, and firmly binds the whole mass together. This mode of planting is found to be far more agreeable to the eye, as also more beneficial to the plants, than the use of "pockets," which, after all, are only substitutes for pots. When planted in the way above described, Ferns have more freedom of action allowed to their roots, which, generally speaking, have a roaming propensity much greater than they are usually credited with. Then, no regular pockets having to be provided for the reception of the Ferns, a smaller quantity of stone material is required, while a greater bulk of earth generates proportionately a greater amount of natural humidity not obtainable from stone, even when this is very porous, which is not always the case. Another benefit derived from this mode of planting consists in the total absence of sourness in the soil through the air having free action all around the surface of the earth—a state of comfort foreign to plants grown in pockets, however spacious and well drained these may be.

The plantation on mounds is particularly recommended for all species provided with running rhizomes, such as certain Adiantums and Acrostichums; but principally for the majority of Davallias, Nephrolepis, and Polypodiums, whose rhizomes soon take possession of the outer surface of the mound; this then becomes rapidly covered with foliage, all the more luxuriant in that the plants have more room allowed for the extension of their rhizomes. These organs, in most instances, require to be kept on the surface of the ground, to which, when planting, they may be fastened by means of wooden pegs; but their adhesion to it, as the plants get established, soon dispenses with the necessity for pegs. In some instances, where the fronds are somewhat sparsely disposed on the rhizomes, it is advisable to prune the latter from time to time, with a view to promoting and encouraging the formation of a greater quantity of rhizomes, which, though of a smaller size, produce a greater abundance of foliage. This operation, which consists in nipping off the extremity of the rhizome and producing bifurcation, is frequently adopted by our market growers, and may be safely performed at any time during the active period of vegetation, but not during the resting season.

The warm Fernery should, all the year round, be kept at a moderate and comfortable temperature; for it has been conclusively proved that, far from being necessary to the comfort of the Ferns, a greater amount of artificial heat than they really require is highly injurious to them. Many growers still entertain the idea that strong heat, combined with heavy shading and abundance of permanent moisture, are essential points in the culture of Ferns, whereas the production of elongated and weak foliage is invariably the result of such treatment. Attention has already been called to the necessity of providing efficient ventilation, as also to the satisfactory condition resulting from the influence of light: now the heating of the warm Fernery is of quite as much consequence, and should be studied most carefully. In the first instance, it is of the utmost importance that no Ferns whatever should be placed in close proximity to the hot-water pipes. The latter should be so disposed as to be completely hidden from view by the rockwork, and air-shafts should be so managed that the heat generated by the pipes may not come in direct contact with the plants, but be diffused in the house by passing through and at the back of the rockwork. Tropical Ferns may be said to have a period of active growth extending from March to September, and during that time all possible advantage should be taken of natural heat, which, even when somewhat strong, is not hurtful. The damage is generally done by the use of artificial heat, which should not be resorted to so long as the night temperature of the house does not fall below 60deg.; the solar heat may, without inconvenience to the plants, raise it to 75deg., or even 80deg., during the day. During the period of rest, from September to March, a minimum night temperature of 50deg. to 55deg. is all that is required, and it need not then be much higher during the day until vegetation commences, when it should be gradually raised to the above-named minimum point.

A much greater number of Ferns than is generally supposed thrive as well in the cool as in the warm Fernery: their growth, however, is not so rapid, although with time they make quite as pretty specimens. It is, indeed, questionable if the cool Fernery is not the more enjoyable of the two, for, when tastefully arranged, nothing can be more interesting, or give greater satisfaction, than such a structure leading from the conservatory; and what renders it still pleasanter is that a more genial and altogether more comfortable temperature may, and should, be maintained in it all through the year. The temperature of the cool Fernery need not at any time exceed 55deg. to 60deg., and it will be found best to keep it at a minimum of from 45deg. to 50deg. during the winter months. It is really surprising to note the number of otherwise really handsome Ferns which, on account of their deciduous character only, have been gradually withdrawn from cultivation, and are now too seldom seen in any collection; yet collections of Caladiums, Gloxinias, Begonias, and other equally deciduous plants, which are at rest for fully six months in the year, are largely grown in private establishments. There is really no reason why several very ornamental kinds of deciduous Ferns which succeed well in the cool Fernery should not be planted among the evergreen sorts, so that when the former are deprived of their foliage their places should not remain conspicuously bare.

Although, when planted out, Ferns are to a certain extent able to take care of themselves, and require comparatively little attention, yet the watering of the natural Fernery is an operation which requires a certain amount of tact; and although it certainly gives a great deal less trouble than does the watering of the same plants when these are grown in pots, it should be attended to very carefully. The watering of such a place by means of a hose fixed to a cold-water pipe (as is frequently seen in private establishments), after numerous careful trials, stands condemned as being a dangerous practice, and one which is productive of very serious evils. The principal drawback arising from watering the Fernery by means of a hose is that, even with the greatest amount of care, many of the plants receive water when they really do not require it, and, when occasionally that operation is left to the discretion of a less experienced, or of a less careful, person, there is always the danger of its being done indiscriminately—the more so that, the water flowing uninterruptedly from the pipe, no physical exertion is required. Now, this water is generally, if not always, far too cold, and by being poured among the roots of the plants in much greater volume than is needed, these get into a bad state of health, from which they take a long time to recover. To make matters still worse, it frequently happens, when the hose is used, that the cold water is lavishly administered over the fronds until these are dripping with it, and this by itself is highly injurious to the plants, which, unless under special conditions, are all the better for having their foliage kept dry.

The only way to water the natural Fernery judiciously is by means of the watering-can and the syringe: this, no doubt, requires more time, and gives a little more trouble, than the hose, but it will be found a great deal more satisfactory in the end, as each plant can then receive water according to its requirements. The greatest danger in such a place is that of giving too much water, for when the Ferns are once well established, and their roots are running freely into a bulk of soil, a long space of time must necessarily elapse before another watering is required. As far as possible, this operation should be performed on the morning of a bright day, so that the extra quantity of moisture thus generated may rapidly evaporate. Condensation on the foliage, if too frequently taking place, will invariably end in turning the fronds to a brown, unnatural colour, and then decomposition commences. To avoid frequent waterings, which must necessarily have for effect the impoverishment of the soil, it is advisable, on bright mornings and all through the summer, to slightly damp the surface of the ground among the plants with the syringe. This helps in maintaining the surface of the soil, where the majority of the young roots are found, in a uniform state of moisture, which is highly beneficial to them. Syringing overhead in the Fernery is not advisable, unless it be in very hot weather, and it should then be done only slightly, and in the morning, so that, all superfluous moisture having time to evaporate, condensation on the fronds may be avoided.

Ferneries constructed on the principles previously described certainly exist in this country, but they are few in number, and not always of easy access. For the benefit of readers living within easy distance of London, we may here state that two such Ferneries are in existence in Chelsea, and that no opportunity of viewing these interesting structures should be missed by persons who take any interest in this beautiful class of plants. These delightful houses may be seen at the establishment of Messrs. J. Veitch and Sons, to whom we are indebted for permission to make the sketches for the accompanying Plates. The principal Fernery, or perhaps "Orchido-Fernery," as we might call it, is a most happy combination. The groundwork of it is a warm Fernery, disposed as has been recommended above, all the Ferns being permanently planted with a view to producing a pleasing effect. The very elegant rockwork, which has been built of pieces of light-coloured tufa cemented together, entirely differs, through its light nature, from any other similar structure with which we are acquainted; a small fountain, in which water trickles down very gently, and only in sufficient quantity to give life to the place, forms part of a centre-piece on which Platyceriums, as well as Polypodiums, Davallias, and other trailing Ferns, are fixed, and on which they appear quite at home. Here the Ferns are planted on slopes and on mounds, although in building the rockwork pockets of various dimensions have here and there been provided. The pockets, however, are not intended for Fern-planting; they have been designed for the convenience of placing in them Orchids, which remain there during the whole time they are in flower. The effect thus produced is really charming, for the lovely colours of the Orchid flowers show themselves off to much better advantage when contrasting with the foliage of the Ferns with which they are surrounded than under any other condition. This unique structure also illustrates to perfection the truth of our assertion as regards light and air being natural agents most required for the well-being of Ferns, as the house is square in shape, with light all round as well as above, and sufficiently ventilated to ensure the lasting of the Orchid flowers. It may be added that, on account of plants in flower always being present in the house, no syringing overhead is ever done, the moisture arising only from the water poured on the walks and other surfaces devoid of vegetation. Yet in such places all the Ferns are growing well. A selection has naturally been made mostly from amongst the Indian and South American species, and, these having been planted in places most appropriate to their requirements, the effect produced is excellent, and all subjects give the greatest satisfaction. There we observe, by the side of the pale pea-green colour of the fronds of *Davallia* (*Microlepia*) *hirta cristata*, whose heavy tassels, produced at the extremity of each division, give an additional grace to a plant which is naturally elegant, the beautifully and richly coloured foliage of *Davallia divaricata* (*D. polyantha* of commerce), whose gigantic yet finely-divided fronds, first of a bright claret-colour, changing to crimson-purple, and turning later on to a bronzy-metallic tint, finally assume a deep green colour, which they retain for months, and as long as they remain on the plant. In such a place one would naturally expect to see Adiantums doing well; and the contrast produced by the gorgeously-coloured fronds of *A. macrophyllum*, *A. rubellum*, *A. tenerum Farleyense*, *A. tetraphyllum Hendersoni*, *A. Veitchianum*, and other species with tinted foliage, too numerous to be mentioned here, with the darker hues of the fronds of such kinds as *A. curvatum*, *A. trapeziforme pentadactylon*, and *A. t. Sanctæ-Catharinæ*, and the light green tints of *A. æmulum*, *A. fragrantissimum*, *A. Moorei* (*amabile*), *A. polyphyllum* (*cardiochlæna*), &c., proves unmistakably that the treatment they receive is that which suits them best. The several species and varieties of *Gymnogramme*, and notably the prettily-crested *G. Parsonsii*, the Cheilanthes, and the

Nothochlænas, planted on the higher part of the rockwork, also testify to their appreciation of this treatment. Among other strong-growing kinds, particularly attractive on account of either the colouring or the shape of their foliage, we note *Davallia pallida* (*Mooreana*), *Didymochlæna lunulata* (*truncatula*), *Marattia Cooperii*, *Nephrolepis davallioides furcans*, *Osmunda regalis palustris*, *Pteris aspericaulis*, *P. Mayii*, &c.; while the section of miniature or dwarf-growing kinds is represented by such plants as *Adiantum Capillus-Veneris fissum*, *A. caudatum ciliatum* (*Edgeworthii*), *A. cuneatum Legrandii*, *A. c. Luddemannianum*, *A. c. Pacottii*, *A. lunulatum* (*dolabriforme*), *Asplenium incisum* (*elegantulum*), *A. lunulatum* (*Fernandezianum*), *A. viviparum*, *Davallia alpina*, *D. parvula*, *Doodia aspera* and its crested variety *multifida*, *Polypodium glaucophyllum*, the exceedingly pretty and equally interesting *Hemionitis palmata*, *Acrostichum* (*Rhipidopteris*) *peltatum* and its exquisitely-divided form *gracillimum*. Even *Pteris scaberula*, although of New Zealand origin, appears, in company with the others enumerated above, to enjoy the temperature common to all of them. In the darker places such Selaginellas as *S. caulescens*, *S. inæqualifolia*, *S. umbrosa*, and *S. uncinata* (*cæsia*), are doing equally well; while *Platycerium alcicorne majus*, *P. grande*, and *P. Hillii*, which are grown on cork blocks, and are hung up against each upright beam on which there is sufficient room to hold them, show sufficiently that the selection of the place in which they are grown has been judiciously made.

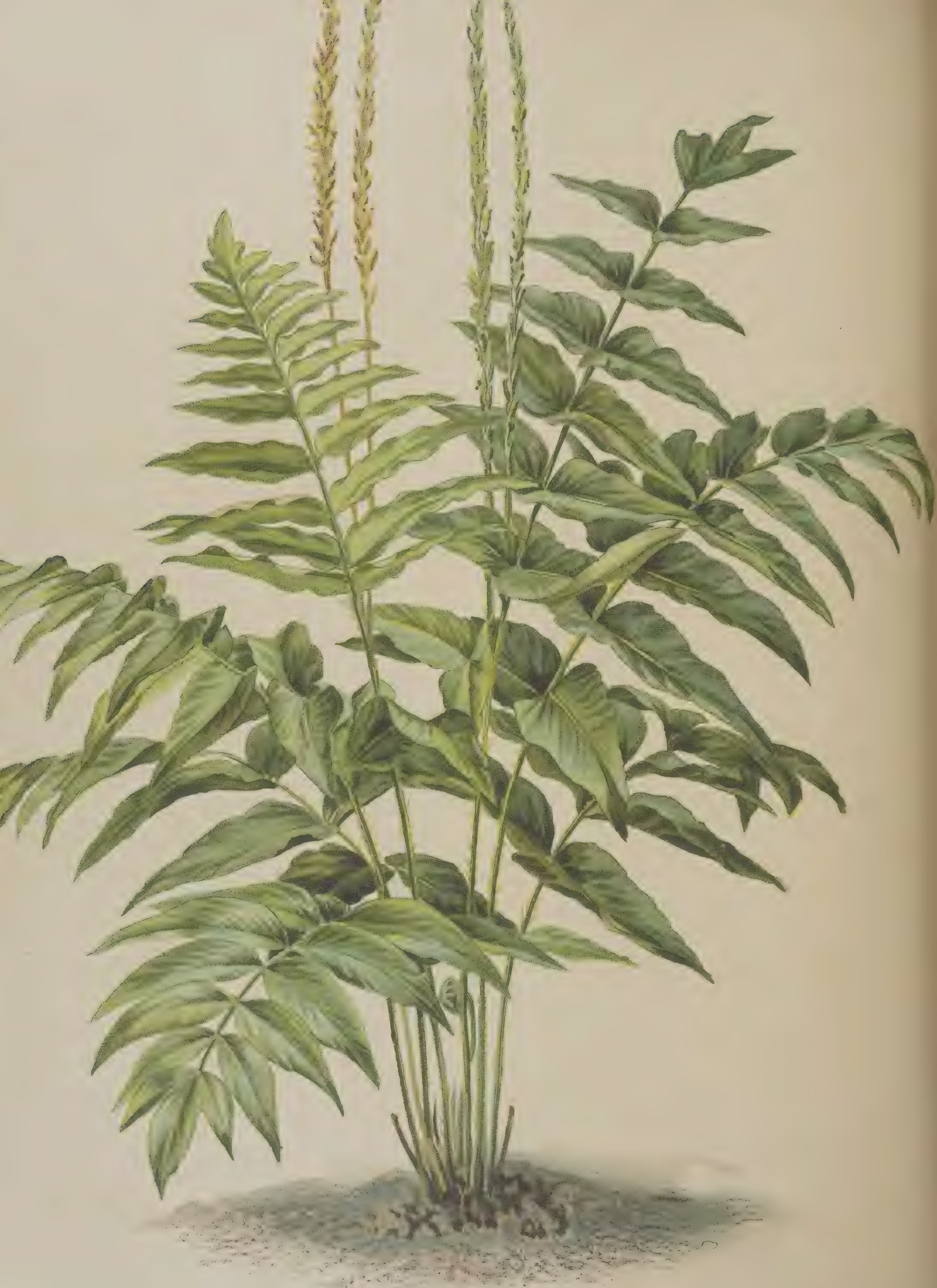
The other Fernery at Chelsea is one exclusively devoted to cool Ferns. It is a span-roofed structure about 36ft. long by 20ft. wide, and although built more than twenty years ago, it may still be held as a model of rockwork building and arrangement, for this comparatively small house justly claims to be one of the prettiest Ferneries now in existence. It is one of the very rare examples in which, instead of sacrificing to the appearance of the rockwork itself, the comfort of the plants, being considered of primary importance, has received special attention. Through judicious selection, and the care and taste displayed in the disposition of the plants, this house has been most conveniently laid out. It is quite a cool Fernery, without any possible means of heating, and yet is fresh and attractive all the year round. In this house, as in the one previously described, no pockets have been provided for the reception of the Ferns: they are disposed in a natural way, among the rocks and on the sloping sides, where they enjoy a considerable amount of light, and on some little mounds of turfy peat, covered with a layer of common green moss, which is kept growing, and in which they luxuriate. In this structure, as in the warm Fernery, nooks and corners have been so managed as to make it appear much larger than it really is. The principal difference between these two houses lies in the materials which have been employed in the erection of the rockwork, and in the selection of the species particularly adapted to each house. In the warm-house tufa has been exclusively employed, whereas in the cool Fernery the principal part of the rockwork is built of brick-burrs, and therefore does not possess such a light appearance; but in both cases the production of a natural and genial atmosphere has been made dependent on the bulk of soil contained in the house when compared with the quantity of rockery. The selection of the species for the houses has, in both cases, received the same amount of consideration, and this cool Fernery is planted with mostly evergreen kinds native of Japan, Australia, and New Zealand, which in this cold Fernery have proved nearly as hardy as our own British sorts. In this house, where the temperature frequently falls below freezing-point, it is interesting to note how Ferns from nearly all parts of the globe thrive together; for, so far as the health of the plants is concerned, there is really nothing to choose between the giant Australian and New Zealand Tree-ferns and the *Dicksonia* (*Balantium*) *Culcita* and *Woodwardia radicans* from Madeira, which, with the various forms of *Aspidium* (*Cyrtomium*), *Nephrodium* (*Lastrea*), and *Pteris*, from Japan, *Adiantum formosum*, *Todea arborea*, &c., from Australia, and *Asplenium* and *Lomaria* from Chili, form a most interesting group of plants. Here, again, a treatment in all respects very similar to that recommended for the warm Fernery is followed, with the exception of the watering, which, on account of the temperature being cooler, is less abundant and less frequent. The complete success obtained in the erection and management of both houses is all the more remarkable when we consider the difficulties under which plants have to be grown in the midst of a populous district, and subjected to the pernicious effects of the London fogs, which are so detrimental to the cultivation of plants in general, and of Ferns in particular.

The outdoor natural Fernery is, or should be, quite as interesting as the warm- or the cool-houses devoted exclusively to these popular plants, and should always form an attractive part of the garden; for, if all Ferns are beautiful, some of the hardy kinds are so cheap as to be within the purchasing power of all, while others are so scarce and costly as to be worthy companions of all that is rich and rare among the gems of the stove and the conservatory. No garden should be without its hardy Fernery, for the popularity of Ferns does not rest only upon their beauty or their price. They possess an additional value, inasmuch as there is scarcely any place in which representatives of some of the genera refuse to grow. Most of them thrive best in the shade; others prefer the brightest light; a third group will live principally on dry walls and chalky rocks; a fourth succeeds nowhere except in abundant moisture; and a fifth revels in the freest air of mountain-tops. Speaking generally, it may be said that, by the formation of a natural Fernery, a shaded place, which would be almost useless for the cultivation of other plants, can be easily and successfully turned into a verdant and highly-interesting spot. The introduction, within the last few years, of North American and Japanese kinds, which have proved perfectly hardy under our climate, has materially added to the great diversity of size and habit as represented by the British species and their numerous varieties.

In the formation of the outdoor Fernery it is essential to study the requirements of the plants rather than to show the building of the rockwork, and to provide against the disastrous effects of high winds, which are injurious to all of them. The tenderest kinds must be sheltered by overhanging trees, and by groups of the more robust sorts, which, when planted in masses and judiciously disposed, considerably help in procuring the comfort necessary to the well-being of the smaller and more delicate species. In most gardens many suitable positions exist which might be rendered very attractive by the introduction of hardy Ferns. As these plants require, during the summer, a great abundance of water at the roots, one of the essential points in connection with the formation of a hardy Fernery is the selection of a place where a good depth of soil, with thoroughly good drainage, can be secured. There, with a pile of rockwork, or, better still, a combination of old tree-stumps, furnished with their large roots, and of blocks of stone—the rougher the better—a Fernery may, with very little trouble and expense, be prepared on either a small or a large scale; and, according to their size and habit, places may be selected to suit all our native Ferns, many of which are as beautiful and as truly decorative as kinds requiring warmer treatment. In planting these, it is advisable to allow sufficient space for their full development, and it is an excellent plan to form a substantial background by planting in masses, instead of singly, in rich loam, such species as the Male Fern, *Nephrodium* (*Lastrea*) *Filix-mas;* the Shield Fern, *Aspidium* (*Polystichum*) *aculeatum* and *A. a. angulare;* the Ostrich-feather Fern, *Onoclea* (*Struthiopteris*) *germanica* and its variety *pennsylvanica*, for which the most exposed places should be reserved. Under the friendly protection of these more robust species, it will be found that innumerable varieties of the Lady Fern, *Asplenium* (*Athyrium*) *Filix-fœmina*, as also varieties of the Male Fern, *Nephrodium* (*Lastrea*) *Filix-mas*, will luxuriate in a mixture, in equal parts, of peat, loam, sand, and leaf-mould ; while the common Hartstongue, *Scolopendrium vulgare*, and its numerous varieties, the Royal Fern, *Osmunda regalis*, and the North American Osmundas, with *Onoclea sensibilis*, and the Marsh Shield Fern, *Nephrodium* (*Lastrea*) *Thelypteris*, will be found to thrive best in the lowest and dampest part of the Fernery. The space existing between and among the above-named species should be devoted to the cultivation of the several species of Bladder Ferns, *Cystopteris alpina*, *C. dentata*, *C. Dickieana*, *C. fragilis*, and *C. montana ;* also to several species of Spleenworts, *Asplenium Adiantum-nigrum*, *A. fontanum*, *A. lanceolatum*, and *A. viride.* The Hard Fern, *Lomaria* (*Blechnum*) *Spicant*, should also be planted under the same conditions, which are equally suitable to *Aspidium acrostichoides*, *A. nevadense*, *A. noveboracense*, *A. Goldieanum*, *Dicksonia punctilobula*, *Woodwardia areolata*, and other North American species of similar growth. The projecting points of the rockwork will be rendered extremely beautiful by being covered; on the driest side, with the common Polypody, *Polypodium vulgare*, and its varieties ; the Parsley Fern, *Cryptogramme* (*Allosorus*) *crispa* ; and such of the species of Spleenwort as *Asplenium Trichomanes*, *A. Ruta-muraria*, and the Scale Fern, *Asplenium Ceterach* (*Ceterach officinarum*), all of which thrive best in a compost in which old mortar and broken bricks form one half, the other half being made of peat and sand.

Another point of great importance to be considered in the plantation of the hardy Fernery is the distribution of the evergreen and the naturally deciduous kinds, which should be disposed in such a way as to avoid at any time a bare appearance and allow the whole place to remain partly covered with foliage during the resting season. Such a place may safely be planted at any time from October to March; but if it is tolerably sheltered, it will be found preferable to plant during the autumn, as root action in most hardy Ferns commences long before there are any visible outward signs of vegetation, and in that case the plants moved in the autumn will, if kept sufficiently moist, have made a quantity of fresh roots, upon which the new growth is mostly dependent. In an exposed situation it is best to plant only in spring, and just before vegetation commences—that is, about the end of March—as the plants are then in most vigorous state, the ascension of the sap rendering them ready to take every advantage of the new soil, the nutritive properties of which are readily assimilated by the roots. Another point worthy of consideration in this case is derived from the fact that if any of the old fronds are injured through the operation, there is but little harm done; whereas if the planting takes place later on, the injuries done to the young growths may result in a permanent disfigurement of the plants.

When a hardy Fernery is once established it requires very little attention to keep it in order. The whole work in connection with such a place is limited to occasional waterings during the summer, while during the winter a slight covering of old leaves or other light material placed over their crowns will enable the tenderer sorts to withstand uninjured the rigour of our severest winters. Such protecting material must be carefully removed as soon as the hard frosts are over, or its presence will prove detrimental to the plants, either by the breaking of the young fronds if the operation is performed when these are partly developed, or by their sudden exposure to drying winds and late frosts, if they have been allowed to make their growth under artificial protection.



ANEMIA PHYLLITIDES

CHAPTER XVI.

VARIOUS FANCY WAYS OF GROWING FERNS.

BESIDES the culture of Ferns on a somewhat large scale, as treated in the previous Chapter, there are many other ways of making the most of these charming plants, such as growing them on cork bark, on hanging blocks, in suspended baskets, in window-cases, and, above all, in glass cases in the dwelling-room. Of these various ways, the last is probably the one which deserves the greatest amount of attention, as it directly affects a very numerous class of lovers of Ferns who, through living partially or entirely in town, are, from want of space or other outside accommodation, deprived of the pleasure of growing their favourites in any of the previously-described ways. Persons of that disposition of mind, residing in the country, may depend on continued enjoyment derived from seeing Ferns in their native habitats; but to many lovers of these plants the pleasure of seeing them growing in their natural state is denied, and it is especially for the benefit of these that the following particulars have been included in this work.

From a purely decorative point of view it may be said that, whether in window-cases, on a rustic stand with a propagating-glass to cover the plants, or in the more commodious Fern-case (the dimensions of which must depend on the size of the room for which it is intended), there are few objects more attractive, and, at the same time, more likely to prove a constant source of pleasure and instruction, than a miniature Fernery planted with judiciously-selected and well-grown Ferns. In such structures an imposing display may be made of Filmy Ferns, as these are the most suitable, as well as the most lasting, of all kinds adapted for growing under such conditions; the only drawback to their general use being the expense, an item which sometimes has to be taken into consideration. Fern-cases may also, more cheaply, yet very effectively, be planted with other Ferns in mixed sorts, a list of which is given at the end of this chapter; but in this instance they require replanting oftener, for, being of more vigorous, or rather of quicker, growth, they more rapidly overgrow the case, which soon becomes a real wilderness. Another reason why Filmy Ferns should, whenever possible, have the preference is, that while their transparent fronds remain uninjured through a prolonged contact with the glass, those of nearly all, if not of all, other kinds soon deteriorate when subjected for any length of time to the influences of the moisture more or less permanent in a Fern-case; so that the economy in choosing commoner Ferns, unless they are only of the cheapest kinds, is more apparent than real.

The most ornamental, but at the same time the most expensive, of Fern-cases is that known as the Victoria case: a spacious structure of oblong shape, with curved or domed top, in which ventilation is provided by means of a movable or sliding strip of glass at the upper part, where the two bent pieces of glass meet, and also through both the ends, which, being hung on hinges, can be opened to admit the exact amount of air required. In this structure all possible light is saved, as there are neither cross-bars nor uprights in the way, each side and each end, as well as each half of the curved top, being individually of only one piece of glass. The bottom part of the case is separated from the soil by a false bottom made of perforated zinc, and the space thus remaining between the two is used for the reception of the water resulting from the watering of the plants; one end is provided with a small tap or hole, through which, by a slight tilting of the case from the opposite end, all superfluous water is easily disposed of. In such a case—the dimensions of which are proportionately as follows: 30in. in length, 16in. in width, and 24in. at the highest part of the curved top—it is comparatively easy to make a miniature rockery, and one which gives immediate and lasting satisfaction. Having laid on the perforated zinc bottom a thickness of a couple of inches of crocks, and covered these with a layer of sphagnum, or, better still, if procurable, a layer of very fibrous peat, to prevent the drainage from becoming choked, all that remains to be done is to fill the bottom of the case, to the depth of about 6in., with a mixture of soil suitable to the kinds intended to be planted in it. If for Filmy Ferns—Todeas, Hymenophyllums, and Trichomanes, mixed—a compost of two parts peat, one part silver sand, and one of partly-decomposed sphagnum, will satisfy all kinds with either crowns or slender, shining rhizomes which delight in running into loose and decayed vegetable matter. If, however, the case is intended to be filled exclusively with *Trichomanes radicans*, it will be best to use, in equal proportions, peat and porous sandstone roughly broken into pieces of various sizes ; to the latter substance the hairy rhizomes cling with great tenacity, while the fleshy roots run freely amongst the pieces, from which they derive all the nourishment they require. Should, however, a commoner class of Ferns be intended to be grown in the case, a mixture of two parts peat or leaf-mould, one part fibrous loam, and one part silver sand, will be found the most satisfactory compost for the majority of kinds used generally for planting in either Fern- or window-cases. In these, as in Filmy Fern cases, a miniature rockery may, with equal success, be prepared, and, the case being usually a fixture, there is no necessity for cementing together the pieces of either tufa or natural stone used in its construction. Provided that these be firmly embedded in the soil, they need only be stood up, and their base may with advantage be planted with small pieces of the dwarf-growing form of *Ficus repens* called *minima*, which in time covers them, and which may very easily be kept within bounds by occasional pruning. Some small-growing Selaginellas may also be planted in close proximity to the stones, whence they will extend and cover the surface of the ground ; and by paying a little attention to them, overcrowding may always be easily avoided.

Next to the Fern-case of oblong shape comes the octagonal structure, and then the plain glass shade, which may be procured of various heights and dimensions, so as to suit plants of different sizes and habits ; but, in all cases, the mode of planting the Ferns and their treatment afterwards are the same. These consist in the dispensation of proper light, ventilation, and judicious waterings. As regards the light, it is advisable, whenever possible, to have the Fern-case placed as near the window as practicable, and have it shaded from the sun when necessary. When the case is devoted to Filmy Ferns, these are all the better if placed near the window with a north aspect, where, although receiving a good deal of light, which shows their transparency to great advantage, the sun never troubles them. When grown in a room, they require but very little ventilation; and, unless there happen to be an excess of condensed moisture, it is best to keep the case closed, for, if exposed for any length of time to the influence of the dry air of a dwelling-room, the delicate fronds soon shrivel up, and are eventually destroyed. Should there be, however, any accumulation of condensed moisture on the glass, it is well to give a little air; but the case should be closed again as soon as the glass is dry. When filled with other Ferns of mixed characters, the case requires a greater amount of ventilation; and, when thoroughly established in it, the plants derive much benefit from a change of air, which should be frequently given with a view to preventing the glass from becoming dim and slimy through the condensation of moisture upon it. Watering is an operation which, in connection with Fern-cases, requires a certain amount of tact, and for which no hard-and-fast rule can possibly be laid down; but it is essential to point out that a great deal of irreparable mischief is frequently the result of a too liberal use of the watering-pot. After being planted in the case, the Ferns should be watered gently until the soil is uniformly damp, and the case being then closed, no more water will be required until the surface of the soil gets dry, when a gentle watering over the ground only, as before, should be given to the extent required; but, in any case, it is most advisable to keep the foliage of the plants dry.

Among other fancy ways of growing Ferns, one of the most popular is in suspended baskets, which, though sometimes made of wood or cane, are usually made of galvanised wire. These baskets are lined with fresh, living moss; this, being firmly pressed against the sides, is sufficient to retain the soil, in which the Ferns should be planted a little below the surface of the wire, so as to allow sufficient room for the water to permeate the whole ball. When baskets are planted too high, the difficulties in keeping the Ferns in good order are greatly increased, and nothing short of frequently-repeated soakings will answer; whereas, if filled only below the level of the rim, ordinary waterings, with occasional dippings, will be found quite sufficient to keep the plants in good condition at the roots. Baskets manufactured of cork bark may also be made very ornamental and rustic, and should be treated in the way stated above, with this difference—that they do not require any lining. The general appearance of suspended baskets of any description is greatly enhanced by the introduction of a few foliage plants of creeping habit, such as *Ficus repens*, *Saxifraga sarmentosa*, green and variegated forms of *Tradescantia*, &c., which, being planted near the edge, soon take possession of the outer surface, covering it more efficiently than the Ferns themselves could do, while the same treatment is applicable to them. A list of Ferns suitable for growing in suspended baskets will be found at the end of Chapter IX., pages 71-2.

Another very effective way of growing Ferns is the one which we have seen adopted with marked success by Messrs. W. and J. Birkenhead, of Sale, near Manchester, and which, we gather from their "Hints on the Cultivation of Ferns," consists in fastening to a piece of cork bark a layer of living moss larger than the cork itself, and roots upwards; on this the Fern is placed, and its own roots are surrounded with suitable compost, in quantity according to size of plant and cork. Over this compost and the roots of the Fern the edges of the moss are drawn so as to cover up all the soil; then the moss and Fern are fastened on to the cork by means of thin copper wire, worked across in different directions, and twisted round copper tacks at the edges of the cork. The whole is then suspended by one hooked wire if to hang against a wall, or by three or four wires and a hook if to hang like a basket from the roof of a greenhouse or of a conservatory. The moss should be kept constantly moist, and the body of moss and soil soaked occasionally in water, to ensure thorough saturation. With this treatment the moss may be made to grow as well as the Fern, forming altogether a most charming object. Such Ferns as Davallias especially delight in having their rhizomes among the damp moss, their roots going through the moss into the compost.

Virgin cork may, indeed, be used in many ways, and always with the greatest effect. One of the prettiest arrangements which has come under our notice was produced by artificial trees, of various dimensions, being made of pieces of cork bark, firmly tied together, yet with little spaces left between the pieces, the hollow parts of which were filled with a compost suitable to the Ferns used. In these crevices, seedling plants of Davallias and Nephrolepis had been inserted when quite young, and their rhizomes and stolons had actually taken entire possession of the cork; the effect produced by the mass of elegant foliage, and also by the rhizomes twining around the cork, being really most pleasing.

The porous bottle is another very ingenious fancy way of growing Ferns, and one which, with proper attention, produces very satisfactory results. A terra-cotta bottle, made of porous material, being procured, is first covered with a layer of clay about 1in. thick, which is fastened to it by means of fine copper wire, worked across in different directions, and into which young seedlings of *Adiantum Capillus-Veneris* are planted, at a distance of 2in. in all directions. The bottle is then filled with water (which is intended to percolate through to the clay), and hung up, being occasionally replenished. No water whatever is given direct to the plants, which rapidly cover the whole surface of the clay, and form a most interesting ball of green foliage, lasting in perfection so long as the bottle, from which they derive the whole of their nourishment, is not allowed to get dry.

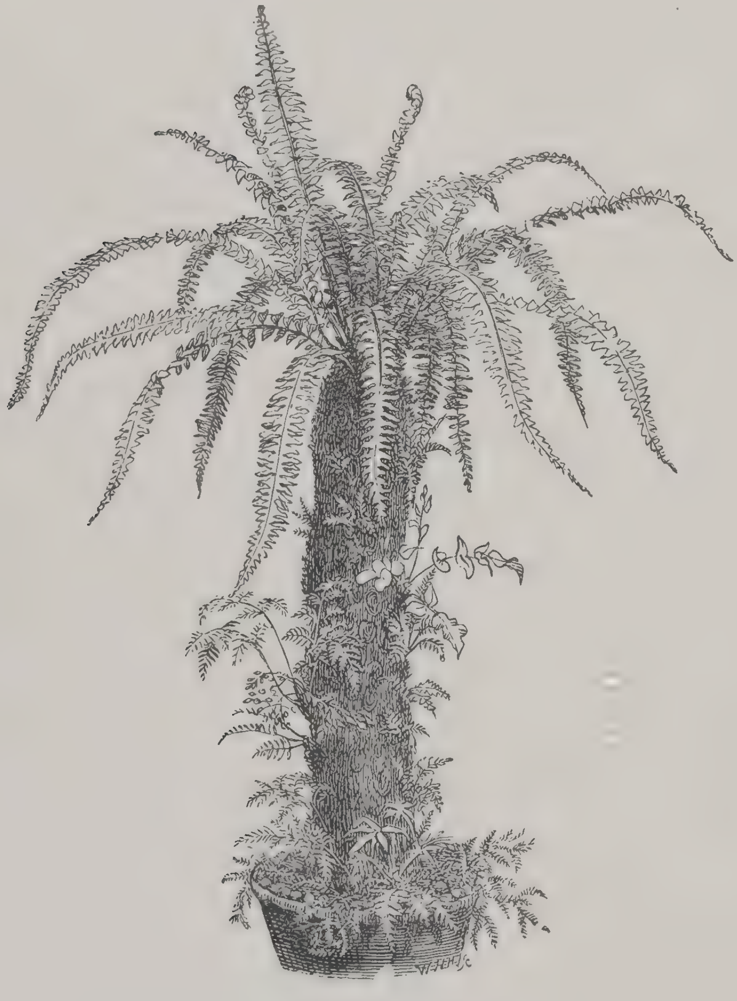


Fig. 12. Dead Tree Fern, decorated with Ferns.

The stems of dead Tree Ferns may also be utilised with advantage in this way: by scooping out the upper part, and filling it with soil, a good-sized plant may be inserted in the top, while the sides may be planted with young seedlings, which, as is shown in our Illustration (Fig. 12), eventually take possession of the whole surface. The best plants adapted for this purpose are the several species of Davallias, and of trailing Acrostichums, Nephrolepis, and some of the Polypodiums, all of which, in their natural state, are found growing in a similar way. These ornamented Tree Fern stems, although practically dead, require to be watered, like Tree Ferns, from the top; and, to keep the artificial growth upon them in good order, the waterings must be both copious and frequent during the growing season, gradually lessening them as the winter approaches.

The little terra-cotta baskets of various forms, and the Egyptian vases and pitchers of diminutive sizes, which are now so frequently met with as one of the principal ornaments of drawing-rooms, also require special attention. The vases and pitchers with the neck a great deal narrower than the body are specially difficult to plant; for, while there is a comparatively large quantity of soil below, the aperture is so small that the introduction of a Fern with foliage corresponding to the size of the vase or pitcher necessitates a great sacrifice of roots, which operation is necessarily injurious to the plant. The plan generally adopted consists in planting these articles of decoration in advance with small seedlings, and allowing them to grow, in a greenhouse or frame, until they correspond with the size of the receptacle, by which time they are thoroughly established and able to stand drawing-room treatment.

The following is a list of the Ferns best adapted for growing in either Fern- or window-cases in a room. The more robust, or those requiring less confinement, are marked with an asterisk (*); while those which thrive best in a close case are marked with a dagger (†). The strong-growing kinds, suitable only for large cases, or for standing in the room without glass protection, are marked with a parallel (‖).

- Adiantum æmulum.*
  - Capillus-Veneris, and varieties.*
  - cuneatum.*
  - diaphanum.*
  - formosum.*
  - hispidulum.*
  - reniforme.*
  - venustum.*
- Aspidium (Lastrea) aristatum, and variety.*
  - (Polystichum) capense.*
  - (Cyrtomium) falcatum.‖
  - (Polystichum) mucronatum.*
  - (P.) munitum.*
  - (P.) setosum.*
- Aspidium (Polystichum) viviparum.*
- Asplenium Adiantum-nigrum.*
  - alternans.*
  - bulbiferum, and varieties.‖
  - Colensoi.*
  - dimorphum.‖
  - ebeneum.*
  - flabellifolium.*
  - lanceolatum.*
- Asplenium marinum.*
  - monanthemum.*
  - obtusilobum.*
  - rutæfolium.*
  - Sandersoni.*
  - Trichomanes.*

- Blechnum occidentale.*
- Davallia dissecta.*
    - Mariesii.*
    - (Microlepia) strigosa.*
    - tenuifolia.*
- Doodia aspera.*
    - caudata.*
    - media.*
- Hymenophyllum, all species.†
- Hypolepis distans.*
    - tenuifolia.||
- Lygodium japonicum (scandens).*
    - palmatum.*
- Nephrodium (Lastrea) decompositum.*
    - (Sagenia) decurrens.*
    - molle.||
    - odoratum (hirsutum).†
    - (Lastrea) patens.||
- Nephrolepis cordifolia (tuberosa).||
    - philippinensis.*
- Onychium japonicum.*
- Osmunda javanica.*
- Osmunda regalis palustris.||
- Pellæa falcata.*
    - (Pteris) geraniæfolia.*
    - (P.) hastata.*
    - rotundifolia.*
- Polypodium acrostichoides.*
    - (Phlebodium) aureum.||
    - (Niphobolus) Lingua.*
    - (Phymatodes) pustulatum.*
- Pteris cretica.||
    - c. albo-lineata.||
    - c. Mayii.||
    - longifolia.||
    - semipinnata.*
    - serrulata, and varieties.||
- Scolopendrium vulgare, various forms.*
- Selaginella helvetica.†
    - Kraussiana, and varieties †
    - Martensii, and varieties †
    - uncinata (cæsia).†
- Todea, all species.†
- Trichomanes, all species.†

CHAPTER XVII.

FERN FOES, BRITISH AND EXOTIC.

IT may be safely stated that insects specially feeding on Ferns are, as a rule, the outcome of improper culture, or of the uncongenial state of the temperature and atmosphere in which the plants are kept under artificial treatment. Anyone may readily be convinced of the truth of this assertion by observing and studying Ferns in their native habitats, where they are seldom attacked by any insects specially feeding on them. Woodlice, slugs, snails, cockroaches, and other pests, are, it is true, particularly fond of the young growths, especially those of the kinds of a succulent nature; and caterpillars, and even mice, play sad havoc among their more mature, as well as among their partially-developed, fronds. But the above are all marauders whose depredations are not limited to Ferns, which they attack in common with other plants, running as they do from one to the other, and destroying them indiscriminately as they come in contact with them. These are fiends to be met with in any culture, and among all classes of plants, feeding on nearly all vegetables alike, and can scarcely bear the appellation of "Fern Foes," as intended here for such insects as thrips (Fig. 13), mealy bug (Fig. 14), scales (Figs. 15 and 16), white and green flies, &c.—these select fronds of the Ferns, to which they attach themselves, and on which they remain as long as any nutriment is to be derived from them. But these insects, unlike the pests previously mentioned, are invariably found on plants out of natural conditions, the constitution of which they materially help to weaken. It is not an uncommon occurrence among Ferns grown in a warm-house to find plants infested with thrips and red spider; but, in nine cases out of ten, when the same plants are subjected to a lower temperature, they remain perfectly clean. The same remarks apply to a little white fly, commonly called the "Tomato Fly," which is distinguishable from all others by its peculiarly abrupt, erratic, short flight, darting instantaneously, when disturbed, from one plant to another, and which almost invariably settles on the underside of the fronds.

Of all the above-named insects, the thrips (Fig. 13) is the most dangerous, for its depredations are swift and irreparable. In the cases of mealy bug, scales, and flies, when the plants have once been freed from their presence, they increase in vigour, and their appearance does not show any signs of the passage of the enemy. With the thrips—which is a small insect, barely $\frac{1}{16}$in. long, white when quite young, and black when adult, and possessed of wonderful destructive powers—it is very different, for it feeds exclusively on the outer coating of the frond on which it lives, leaving behind it marks which nothing can remove. On account of the delicacy of their texture, and of the very fine nature of their foliage, the process of washing or sponging, which is practicable in most other classes of plants, is almost impossible in regard to Ferns; other means of getting rid of these pests must therefore, in most cases, be resorted to. Attention has already been called to the greater liability to which Ferns grown in too high a temperature are subject regarding the attacks of the thrips, which soon disfigure them entirely, and which, when found only in small quantities, may be picked off the plants by hand, and then be kept under by the said plants being subjected to a cooler treatment afterwards. But if the Ferns have been allowed to get badly infested with thrips, the only remedy lies in the application of tobacco-smoke or, better still, of tobacco-vapour. A full description of the genus *Thrips* is given in Nicholson's "Dictionary of Gardening," vol. iv., p. 30.

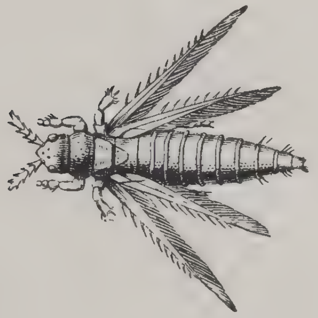


Fig. 13. Thrips (magnified).

Ferns, however, are, as a rule, very sensitive and very adverse to fumigation, and when this operation has to be resorted to, it is far better to smoke the house moderately in the evening, and repeat the operation the next morning, than to smoke strongly at once. It is also preferable to smoke with pure tobacco than to depend on tobacco-paper or tobacco-cloth, either of which develops fumes more or less injurious to Ferns. Even pure tobacco-smoke becomes hurtful when applied too strongly, and a slight dose repeated two or three times will prove more effectual and safer than one strong fumigation. A great deal of inconvenience to the Ferns is avoided by the use of tobacco-steam instead of tobacco-smoke: indeed, we have seen it applied in numerous cases, and have never had to record a serious mishap in connection with its use. Very little observation is needed to demonstrate that it must naturally be a safer process, as, instead of being rarefied by the action of the fire, like tobacco-smoke, it is of a moist nature; and it must also be more efficacious, inasmuch as, instead of being light, and naturally ascending like smoke, it is heavier than the atmosphere of the house, and, after rising a certain height, it falls on and among the plants like a dew, so that the insects cannot possibly escape the deadly effects of the nicotine deposited everywhere in that way. The excessive bitterness with which everything in the house becomes impregnated by its use also acts as a very efficacious and safe preventive.

There are many ways of generating tobacco-steam, and a very ingenious machine, called the "Thanatophore," has been invented for the purpose of steaming tobacco-juice and disseminating it in the houses. Syringing hot-water pipes with diluted tobacco-juice will, to a certain extent, help to keep the place free from insects; but this, although apparently a very simple and primitive method, is almost as expensive as the "Thanatophore," on account of the unavoidable loss of material, and is less effective than the following process, which is simple, safe, and does not require any special tuition or preparation: Put into a *deep* iron pot, say, 2qts. of tobacco-juice, specially manufactured for steaming and of guaranteed strength, procurable from the principal nurserymen; then put into the furnace a fire-brick, and when this has become white-hot, take it out of the fire, and straightway put it into the iron pot containing the tobacco-juice, closing the door of the house. We purposely say *deep* iron pot, as the juice, when hot, has the property of rising considerably, in the same way as milk, and unless this expansion be provided for, only a small part of the material would be used: the greater portion of it, running over the sides of the pot, would be entirely wasted. By the time the brick has completely cooled down, all the nicotine will have been extracted from the juice and distributed in the form of steam all over the house, which, when of very large dimensions, may require two, three, or even more, similar pots and bricks. By this process not only does the nicotine, through its purity, remain harmless to the plants, but it also reaches green and white flies as well as thrips. Thrips have a very clever way of instinctively letting themselves down to the ground as soon as the smoke approaches them, and in that way partially, and sometimes even totally, avoid its effects. Another point in favour of tobacco-vapour lies in the fact that there can be no flaring up, as is frequently the case with tobacco-paper or with tobacco-rags, when the effects are really disastrous.

Like tobacco-smoke, tobacco-steam is destructive only to breathing insects, and then only when these have no means of escape ; but it has no effect either on mealy bug (Fig. 14), which must be removed by hand—all the insecticides which up to the present have been found capable of destroying it being at the same time equally injurious to Ferns—or on scale (Figs. 15 and 16), which must also be washed off or picked by hand. The latter insect, which has all the appearance of a small protuberance of either brown or whitish colour, although apparently remaining stationary, multiplies, and, notwithstanding the apparent absence of legs or of any other means of locomotion, spreads rapidly, mainly through the agency of ants, which derive some nourishment from its exudations. Accordingly, the ants—remarkable alike for their activity and their foresight—form "plantations" of scales, much in the same way as we form orchards, oyster-beds, &c., by carrying them from one plant to another (a performance which has many times been watched with keen interest by observers), and setting the mother scale so that it may easily adhere to the stem or the under-part of the frond, where a young colony surrounding the old scale shortly makes its appearance, and, unless its progress be checked at the outset, soon spreads over the whole plant on which it lives. This mode of transport by ants explains the spreading of scales from one plant to another of the same kind situated at a considerable distance, and for which it is difficult, if not even impossible, to account in any other way. The scales are very difficult to remove, on account of the inefficiency of known insecticides,

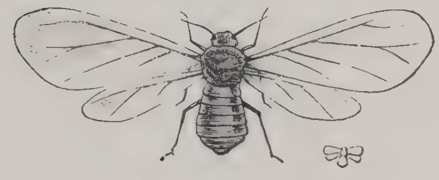


Fig. 14. Mealy Bug
(magnified and nat. size).

which do not appear to take any effect on them. When the fronds infested with scales happen to be old, they may with safety be cut clean off; but, unless the Fern be of a deciduous nature, the whole or even the greater part of the fronds should not be cut off at once, as in most cases this mode of curing would prove quite as dangerous as the complaint. The most practical way is to pick off by hand all that can be seen, and then to well wash the plant with warm water containing soft soap in the proportion of 2oz. to 1 gallon of water; by that means, the young brood of very minute scales, which have been unavoidably missed, will be effectively destroyed. A most interesting dissertation on scale insects, and their mode of reproduction, is published in Nicholson's "Dictionary of Gardening," vol. iii., p. 378.

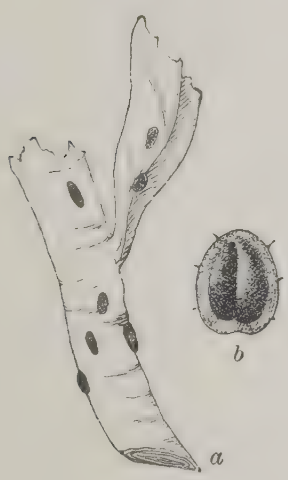


Fig. 15. Scale Insect (Lecanium Hesperidium).

a, Twig and Leaf bearing Females (nat. size); *b* Female (magnified).

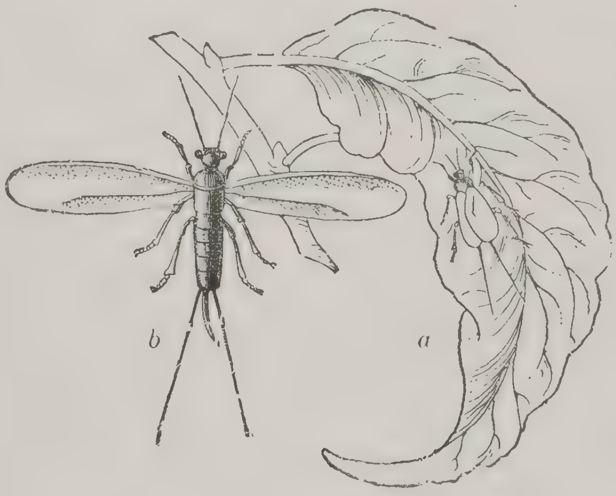


Fig. 16. Scale Insect (Lecanium Persicæ).

a, Leaf with Male on it (slightly enlarged); *b*, Male flying (much enlarged).

As the ant is, in many instances, the travelling medium of the scale, it may also be classed among the Fern enemies, and its presence in the Fernery must be checked by all possible means. Among the many ways recommended for destroying ants, one of the easiest and most efficacious consists in laying in the places where they are accustomed to assemble pieces of thick twine or rope, about 1ft. long, which have been previously dipped in a syrup made of coarse sugar. The ants cluster in great numbers upon these strips, which, from time to time, can easily be taken up and dipped into boiling water. The same satisfactory results may be obtained from the use of a good-sized sponge, sprinkled over with finely-powdered sugar: the sponge, thus prepared, being laid near the holes whence the ants issue, becomes in a short time quite a living object, the ants filling up the holes of the sponge, which may then be plunged into boiling water.

Although they sometimes attack hardy Ferns, all the above-mentioned insects are particularly the enemies of stove and greenhouse kinds. British Ferns have as their greatest foe a semi-transparent green fly, which affects principally the Lady Fern, *Asplenium* (*Athyrium*) *Filix-fœmina;* it apparently lays its eggs in the crowns of the plants, so that in the spring they rise with and hatch upon the young fronds, upon which the young brood feed at once. It is easily distinguished from the common green fly as it runs about swiftly, and is a voracious sap-feeder. Like the thrips among stove and greenhouse kinds, this fly rapidly spoils the appearance of the Ferns with which it comes into contact; after its passage, traces are left which cannot by any means be eradicated. This insect appears to thrive best where light is somewhat scanty, as it is in such places that its depredations are mostly noticed. It is only seen in spring and early summer, and this is explained by its transformation, about July, into a shining, hard, brown insect, having much resemblance to a large flea. The most practical way to deal with the insect is to carefully search for and destroy the first spring broods, by which means its spreading is abruptly arrested. British Ferns have also in the leather-coated grub of the "daddy long-legs" (Fig. 17) a very serious enemy, which, during its nocturnal excursions, plays great havoc among the young fronds of many kinds. Its depredations are carried on all the safer as, through its general appearance, very little, if any, suspicion is attached to it; when full grown, this insect, if we may call it by such a name, resembles a tiny, dull black sausage seldom exceeding 1in. in length, and is very destructive. It is essentially a night-feeder, and never gets far away from its larder, burying itself in the ground close to the plant attacked. The best plan, when it has been ascertained that this is the cause of the mischief, is to lift the plant bodily out of the soil with all the earth possible, and then, with a hand-trowel, see if the delinquent has taken refuge in the soil surrounding the ball (in which it frequently buries itself after its meal, and from which it emerges the following night); by this means its destruction is greatly simplified.

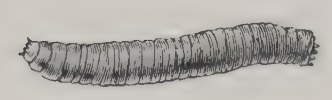


Fig. 17. Grub of "Daddy Long-Legs"
(nat. size).

Caterpillars cannot be said to be very particular as to the nature of the Ferns on which they feed, for we have frequently had the opportunity of observing the same individual going from the soft-textured Lady Fern, on which it was hatched, to the more succulent *Asplenium lucidum* and *Polypodium aureum*, and thence to the leathery *Lomaria procera* (*chilensis*), oftentimes even attacking the harsh foliage of *Dicksonia antarctica*, and that in a house where any amount of softer or tenderer foliage was at hand. Consequently, it is no easy matter to allure these pests towards any particular bait, and the only way of getting rid of them is to pick them off by hand. A great deal of anxiety later on can, however, be avoided by acting on the axiom that prevention is better than cure, and by paying special attention during the summer to the destruction of all moths and butterflies making the Fernery their headquarters or their rambling-grounds.

For woodlice, scooped-out pieces of potato, turnip, &c., or traps consisting of pots laid on their side, with a little moss in them, to which they will retire for a hiding-place, may be laid with success. For slugs and snails, pieces of lettuce and cabbage leaves are said to be attractive, but by far the best material is fresh bran, which should be disposed in small quantities about the house, and to which it will be found that they go in preference to any other bait. As it is usually at night that these pests come out, it is indispensable to search diligently for them by lamplight, when many of them will be found making their way to, or already buried in, the bran. Searching for the above foes will also afford an opportunity of catching cockroaches, if there are any about the house, as these seldom come out before night. They usually infest warm-houses only, and they select for resting-places the warmest corners, whence they direct their nocturnal visits, retiring to their haunts before daylight. Cockroaches (Fig. 18) are seldom found in greenhouses, or in places where the temperature is allowed to fall below 50deg. ; and when accidentally found under such conditions, their running powers, which under the influence of a warm temperature are excessive, seem paralysed, and their destruction then gives very little trouble. However destructive to Ferns, and although feeding, as they generally do, on the young

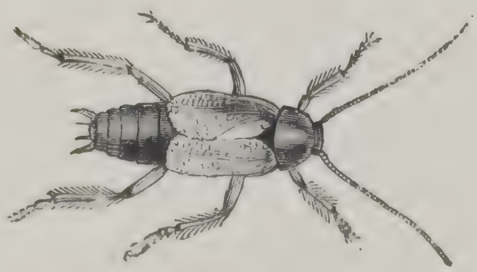


Fig. 18. Female Cockroach.

and partly-developed fronds, cockroaches are not entirely herbivorous. They are particularly fond of phosphorus, and this taste on their part makes their destruction easy when compared with that of many of the other warm-house pests. Pieces of phosphorus paste (Chase's Beetle Poison), placed here and there in the infested house, very quickly attract them, and as effectually destroy them. Whatever has not been eaten should be taken up in the morning before any water has been thrown about the place, and also before any strong light has had time to play on the said paste, which in either case loses its virtue; but if carefully picked up, and put into the close box, as advised, it can be used again with as much effect as fresh paste. Cockroaches thus destroyed should not be swept clean away, as they do not emit any offensive smell, and are usually eaten up by any others which have not fed on the paste, and which are thereby poisoned in their turn. Birkenhead's Beetle Trap (Fig. 19) is also of great value in the Fernery, as indeed in any other plant- or fruit-house, and likewise for domestic purposes. It is a simple, cheap, and very effective contrivance, which cannot get out of order, and by means of which thousands of cockroaches and beetles may be destroyed in a remarkably short space of time.

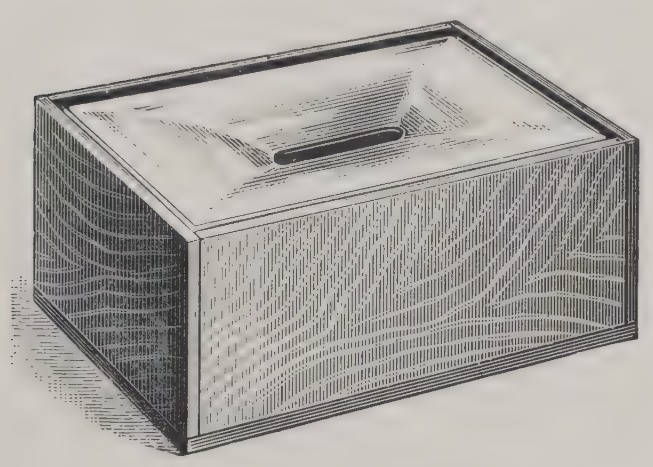


Fig. 19. Birkenhead's Beetle Trap.

Although, in many instances, earth-worms may be considered useful in renewing the surface of the soil, by bringing up from the subsoil finely-divided earth, as also by favouring, by means of their burrows, the circulation of air and water to certain depths, and by promoting a more rapid decay of vegetable matter in the soil, yet these sometimes useful creatures may also be included in the list of Fern foes. Besides disturbing to a great extent the surface of the soil, where the Fern roots principally spread, the worms have a natural habit of dragging into the ground tree-leaves, and also the ends of living fronds, in which way they make themselves particularly obnoxious. It is when they get into flower-pots, however, that worms are most troublesome and hurtful, and require to be destroyed, for, in such instances, the soil is rapidly decomposed on account of the vegetable matter which it contains being digested by them without any additional nutritive matter taking its place. Among the several ways of getting rid of worms, the watering of the soil (whether in a flower-pot or in the open ground) with a weak solution of smelling-salts or carbonate of ammonia is about the simplest, as also the most efficacious, as it causes the worms to come to the surface of the ground in a very exhausted condition. The same effect is also produced by an infusion of walnut-leaves. The watering of the soil with a solution of lime-water soon clears the ground of all worms, but there are many kinds of Ferns and other plants to which an application of lime-water would prove more hurtful than the presence of the worms themselves. Whenever any of the processes above recommended have to be resorted to, it is best to make the application in the evening, as it is then that worms are near the surface of the ground. Again, it will frequently have been noticed that after a warm shower, especially in the evening, worms in enormous quantities crawl out of their holes in search of food, and they may then be collected, if necessary, by the aid of a lantern; but this is an operation which requires to be quickly performed, for it is well known that the vibration of the soil caused by footsteps, or the appearance of light, causes the worms to beat a hasty retreat into their holes. Their increase may also be greatly checked by the introduction, in the garden or in the Fernery, of hedgehogs, shrew-mice, and frogs, all of which feed largely on worms.

A word of protest against the destruction of a harmless, or rather of a useful, creature—which, instead of being protected as it deserves, is generally hunted down by persons well-intentioned, no doubt, but possessing no knowledge of its value in the garden—must be entered here in favour of the Testacella Slug (Fig. 20). This humble creature, which, unlike the other slugs, is insectivorous, may rightly be termed the gardener's friend, as it feeds exclusively on worms, which it follows into their burrows. Its presence in the garden and in the Fernery is undoubtedly beneficial to these places, and its distinctive outward characters should be made widely known, so as to protect

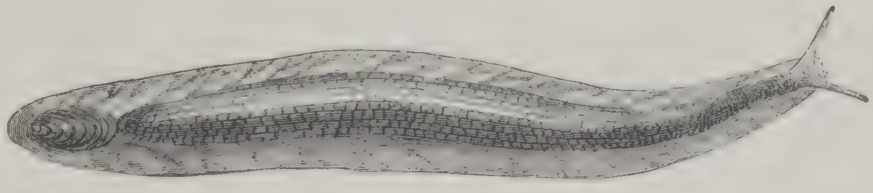


Fig. 20. Testacella Slug (Testacella haliotidea) (nat. size).

it from further molestation. Its slender body, when fully extended, is about 3in. long, of a dirty yellow colour, with brown specks, rarely pale yellow, and sometimes entirely black. The hinder part of its back is provided with a small, ear-shaped, flat, greyish shell, about $\frac{1}{4}$in. long, which protects the rear of the animal when in the burrows. This slug, which bears the name of *Testacella haliotidea* (Fig. 20), is known to occur in many localities in the South of England; and, according to Professor Trail (in Nicholson's "Dictionary of Gardening," iv., p. 19), has been found as far north as Kirkcaldy, in Fifeshire. There exists another species, named *T. Maugei*, possessing the same insectivorous nature, indigenous in South-west Europe, but which has, however, naturalised itself in the neighbourhood of Bristol; it differs from the one above mentioned by the uniform dark brown colour of its body, and by the larger dimensions of its shell, which is the external character distinguishing both species from the ordinary slugs so justly feared in the Fernery on account of their depredations.

CHAPTER XVIII.

ACROSTICHUM, *Linnæus.*

(Ac-ros′-tich-um.)

THIS very extensive genus, which, in Hooker and Baker's "Synopsis Filicum," is given as genus 60, and which forms by far the greatest portion of the *Acrosticheæ* (Ac-ros-tich′-ĕ-æ), is composed almost exclusively of tropical Ferns, and comprises various groups with a wide range of venation and cutting.

For diversity of foliage, as also for variation in habit, few other genera can compare with *Acrostichum*, as it embraces plants of the smallest dimensions, and others of quite gigantic size, as well as plants with simple (without distinct ramifications) or entire fronds, and others with fronds pinnatifid (divided half-way to the midrib in segments in a feathery manner), pinnate (divided to the midrib in a feathery manner), or even bipinnate (doubly pinnate). The distinguishing characters of *Acrostichum* proper reside in the nature and in the disposition of the sori (clusters of spore-cases), which are spread over the whole under-surface of the fertile fronds, or of their upper pinnæ (leaflets)—or, occasionally, over both surfaces—and are not confined to the veins only.

The following are the various groups included in this genus:

ACONIOPTERIS (Ac-on-ĭ-op′-ter-is), *Presl.*—Fronds simple; veins anastomosing (intermixed), united only near the margin.

CHRYSODIUM (Chry-so′-dĭ-um), *Fée.*—Plants with fronds dimorphous (of two different forms), or sometimes with the upper pinnæ like the others, and fertile; others with barren fronds sometimes simple but forked, or pinnatifid (the divisions of the pinnæ not extending quite to the stalk or rachis) or pinnate at the base when fully developed; some species also copiously pinnate, and even doubly pinnate. Main veins none, or indistinct.

Egenolfia (Eg-en-olf′-ĭ-a), *Schott.*—The characters peculiar to the plants belonging to this group differ from those belonging to *Polybotrya* (Pol-yb-ot′-rў-a) only through the presence of a seta (bristle) in the sinus (depression) of the lobes of the ultimate divisions.

Elaphoglossum (El-aph-og-lōs′-sum), *Schott.*—An important group, comprising numerous species with fronds either simple or pinnate, and veins free; the barren fronds of some species being nearly or quite naked, the edge not fringed; others, with both surfaces also nearly or quite naked, have the edge of their fronds fringed; some, again, have the upper surface of their fronds slightly, and others densely, scaly.

Gymnopteris (Gym-nop′-ter-is), *Bernhardt.*—Ferns belonging to this group are peculiar through the dimorphous nature of their fronds, which in some species are entire, and in others sometimes simple, but with one or two pairs of pinnæ when fully developed; in other cases, copiously pinnate. Veins copiously anastomosing, the main vein being distinct, and extending nearly or quite to the edge.

Hymenolepis (Hym-en-ol′-ep-is), *Kaulfuss.*—Plants with simple, uniform fronds, bearing the fruit on the contracted apex (point).

Olfersia (Ol-fer′-sĭ-a), *Raddi.*—Fronds pinnate, with veins anastomosing, and united only near the margin.

Photinopteris (Pho-ti-nop′-ter-is), *J. Smith.*—Ferns with pinnate or deeply-pinnatifid (divided nearly to the midrib) fronds, easily distinguished through the fruit being disposed on the Lomaria-like upper pinnæ.

Polybotrya (Pol-yb-ot′-rў-a), *Humboldt and Bonpland.*—Plants with barren fronds variously pinnate and pinnatifid, but not of Lomaria-like habit; veins pinnate in the ultimate divisions of the fronds, except in *A.* (*P.*) *bifurcatum* (bif-ur-ca′-tum), where a single vein is carried into each ultimate division.

Rhipidopteris (Rhi-pid-op′-ter-is), *Schott.*—A small group of plants with venation flabellate (fan-shaped); fertile fronds small, sub-orbicular (nearly round), and uncut.

SOROMANES (So-rom′-an-ēs), *Fée.*—Ferns with veins pinnate, a few of those of contiguous groups usually joining.

STENOCHLÆNA (Sten-och-læ′-na), *J. Smith.*—Ferns with fronds simply pinnate, and somewhat resembling those of *Lomaria* (Lo-ma′-rĭ-a) as regards their shape, their texture, and their fine, close venation.

The name *Acrostichum*, from *akros*, outermost, and *stichos*, row (*i.e.*, beginning of a verse), refers to the disposition of the sori, which have been thought to resemble the beginning of lines of verse.

Culture.

The genus is exceedingly rich in plants of decorative value, some of the strongest-growing kinds being particularly adapted for covering trunks of Tree Ferns, walls, columns, &c., which they ascend by means of the extension of their rhizomes (prostrate or subterranean stems, emitting leaves at the growing point and rootlets along the surface), and in which situation they produce a very striking effect, hiding as they do unsightly supports or other equally objectionable subjects. The species with long fronds are particularly valuable for growing in hanging baskets; while, for most of the species with entire or simple fronds, pot-culture must necessarily be resorted to. In whatever way they are grown, Acrostichums require a liberal supply of water at the roots; consequently, the compost used must be of a very porous nature. A mixture of two parts fibrous peat, one part chopped sphagnum, and one part coarse silver sand, will be found to suit nearly all known species. Although over one hundred species of Acrostichums are enumerated in the "Synopsis Filicum," it has been thought necessary to make a judicious selection, and, accordingly, only the most striking forms have been fully described here; names of those possessed of mere botanical interest have been inserted in their alphabetical order, to record their existence, but without lengthy comments.

Principal Species and Varieties.

A. accedens—ac-ce′-dens (approaching), *Mettenius.*

A species of botanical interest, native of the Andes of Bolivia.—*Hooker, Synopsis Filicum*, p. 523.

A. acrocarpum—ac-roc-arp′-um (pointed fruit), *Martens.*

A species of dwarf dimensions, and of only botanical interest, native of Central Brazil.—*Hooker, Synopsis Filicum,* p. 522.

A. (Polybotrya) acuminatum — Pol-yb-ot′-rў-a ; ac-u′-min-a′-tum (taper-pointed), *Hooker.*

On account of the drooping character of its light green fronds, of a firm texture, which are abundantly produced from a thick, climbing rhizome (prostrate stem), this Brazilian, stove species may be considered one of the most decorative kinds comprised in the genus. The barren fronds, borne on

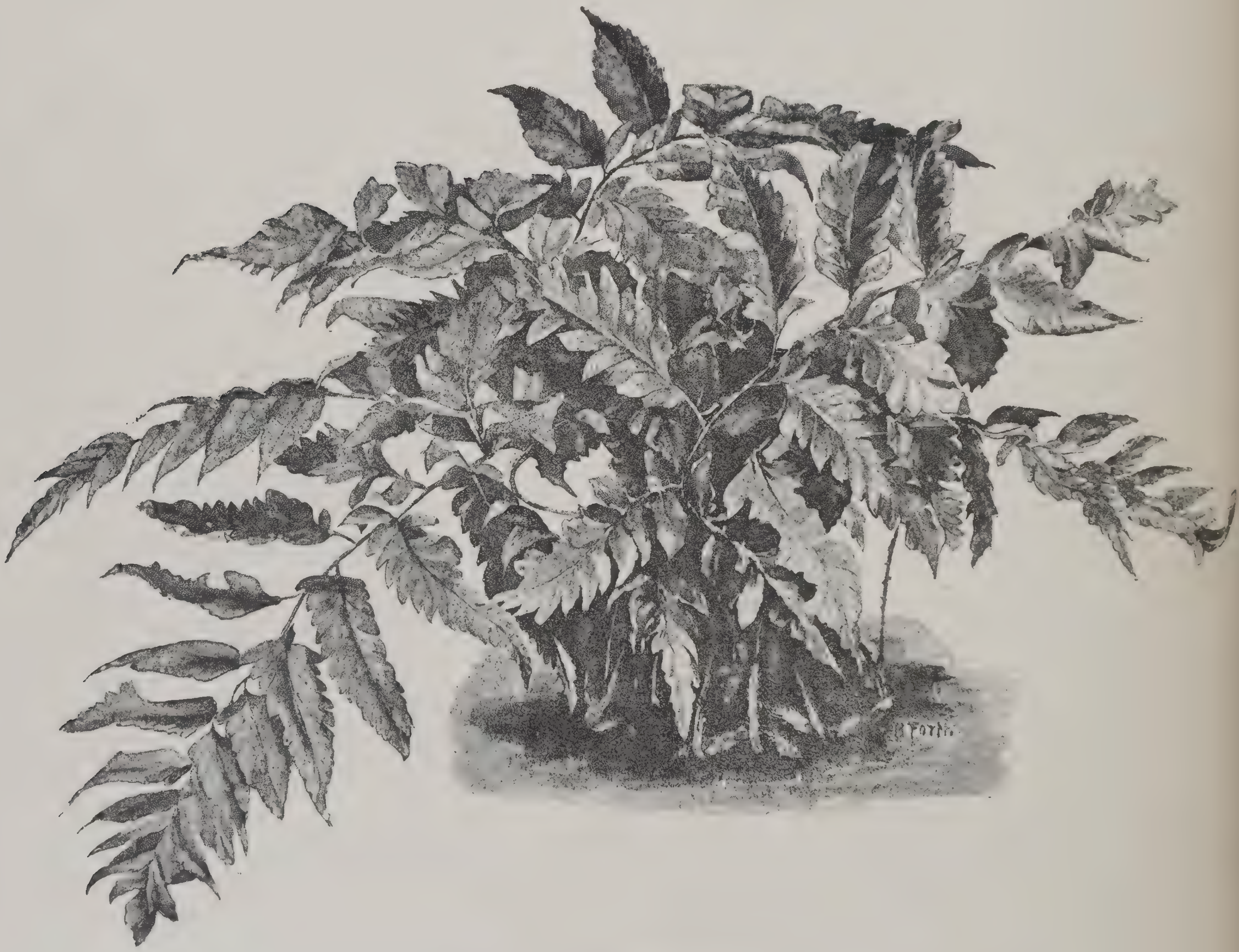


Fig. 21. Acrostichum acuminatum

(⅙ nat. size).

firm, erect stipes (stalks), 4in. to 6in. long, and scaly throughout, are from 1ft. to 2ft. long and fully 1ft. broad, deltoid (in form of the Greek delta, Δ) and simply pinnate (divided to the midrib), with their upper pinnæ (leaflets) slightly lobed, truncate (terminating abruptly) on the lower side at the base, 6in. to 8in. long, and 4in. to 6in. broad, usually furnished with small pinnules (leafits) on each side. The fertile fronds are 1ft. long, deltoid, and thrice pinnate. See Fig. 21.—*Hooker*, *Species Filicum*, v., p. 245. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

Although its fertile fronds are said to be sub-quadripinnatifid (four times nearly divided to the midrib) at the base, the Peruvian *A.* (*Polybotrya*) *nutans*, Kunze, appears to be closely related to this species.

A. (Gymnopteris) alienum—Gym-nop′-ter-is ; al-ĭ-e′-num (foreign), *Swartz.*

The fronds of this handsome and distinct stove species (native of tropical America, Cuba and Mexico to North Peru and the Amazon Valley) are produced from a woody rhizome (prostrate stem), and are borne on stalks 6in. to 8in. long, and scaly downwards. Although of a similar shape, and of the same papyraceous (paper-like) texture, the barren and fertile fronds are very different in size: the former, from 1½ft. to 2ft. long, and often 1ft. broad, have their upper part deeply pinnatifid (the divisions of the pinnæ not extending quite to the stalk or rachis), with lanceolate (spear-shaped) lobes, while the lower part is pinnate (divided to the midrib), with lower pinnæ entire (uncut) or deeply pinnatifid. The fertile fronds, which are much smaller than the barren ones, are furnished with distant (not close), narrow-linear (considerably longer than broad) or pinnatifid, leafy pinnæ (leaflets).—*Hooker*, *Species Filicum*, v., p. 272. *Nicholson*, *Dictionary of Gardening*, i., p. 18.

A. alpestre—al-pest′-rĕ (alpine), *Gardner.*

A species of botanical interest, native of the Organ Mountains, Brazil.—*Hooker*, *Synopsis Filicum*, p. 405.

A. amygdalifolium—am-yg′-dal-if-ol′-ĭ-um (Almond-leaved), *Mettenius.*

A species with dissimilar fronds of small dimensions, native of Costa Rica.—*Hooker*, *Synopsis Filicum*, p. 520.

A. (Polybotrya) apiifolium—Pol-yb-ot′-rӯ-a ; ap-ĭ-if-ol′-ĭ-um (Parsley-leaved), *Hooker*.

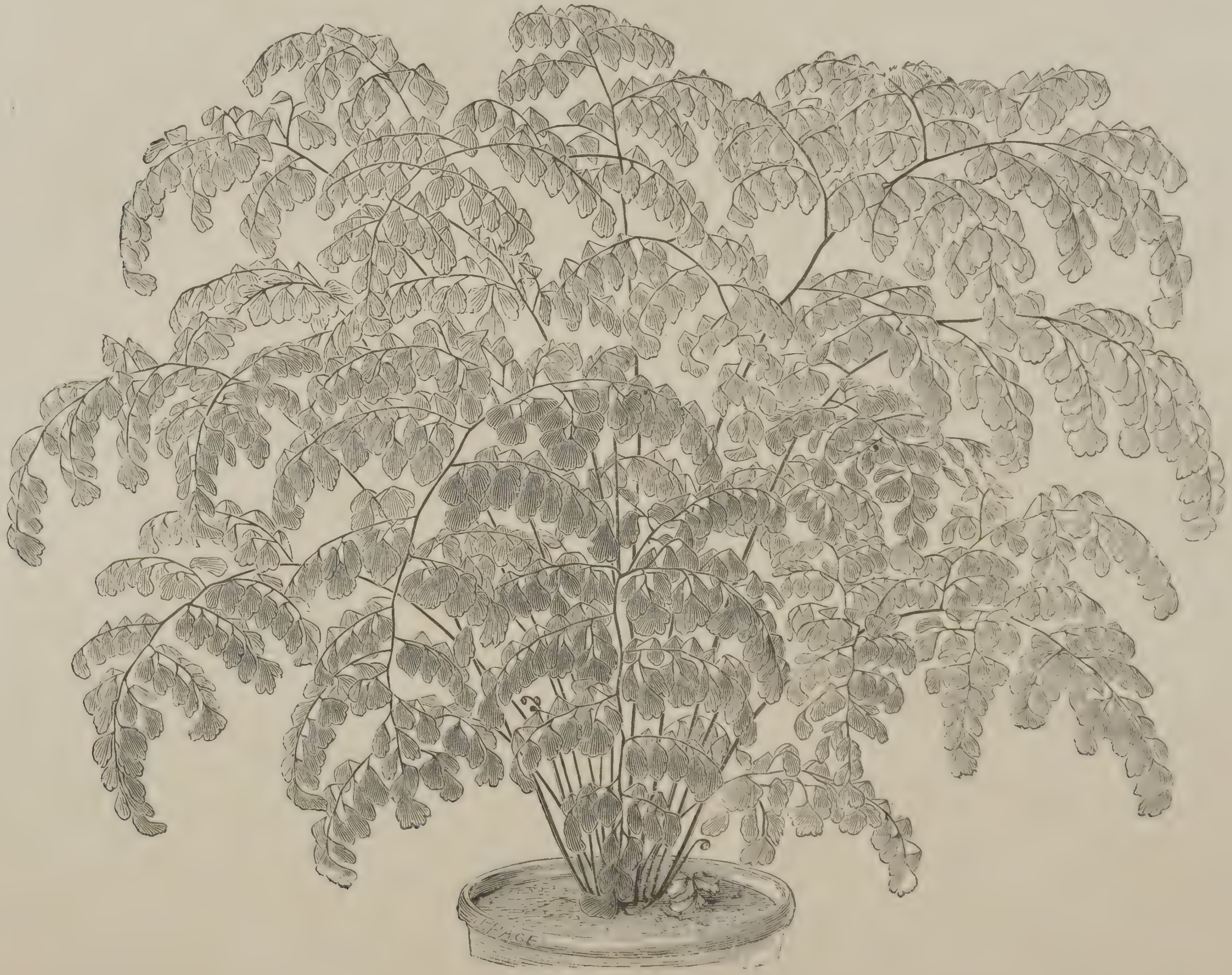
This pretty, though very dwarf, stove species, from the Philippine Islands, is totally distinct from all other Acrostichums, on account of its habit, which greatly resembles that of an Anemia. The barren fronds, 4in. to 6in. each way, are borne on stems about 2in. long, erect, and densely clothed with tomentum (short, woolly hairs) ; they are tripinnate (three times divided to the midrib), with pinnæ (leaflets) close, the lowest pair only having pinnatifid pinnules (leafits divided not quite to the midrib), while the ultimate divisions are oblong-rhomboidal, their outer edge slightly toothed. The fertile fronds are borne on a slender and entirely naked stem, 6in. to 8in. long ; they are panicled (furnished with distinct, branching peduncles), with a few distant, slender, either simple (uncut) or compound (set together) branches. Both are produced on a stout, woody, erect caudex (upright stem).—*Hooker*, *Species Filicum*, v., p. 248. *Nicholson*, *Dictionary of Gardening*, i., p. 18.

A. (Elaphoglossum) apodum—El-aph-og-lōs′-sum ; ap′-od-um (stemless), *Kaulfuss*.

A very interesting and ornamental stove species, native of the West Indies to Brazil and Peru. Its barren fronds, 1ft. long, 2in. broad, are produced from a thick, woody caudex (upright stem) densely covered with linear (long and very narrow), crisped, brown scales, and have a very hairy appearance, produced by the short, brown hairs with which the edges and midrib are densely fringed. The fertile ones are much smaller, but both are of a subcoriaceous (almost leathery), thin texture.—*Hooker*, *Species Filicum*, v., p. 213. *Nicholson*, *Dictionary of Gardening*, i., p. 18.

A. (Egenolfia) appendiculatum—Eg-en-olf′-ĭ-a ; ap-pen-dic-ul-a′-tum (having an appendage), *Willdenow*.

This highly decorative stove species produces from a firm, woody, rhizome (prostrate stem), barren fronds, 1½ft. to 2ft. long and 6in. to 8in. broad, simply pinnate (cut down to the midrib), with winged rachis (stalk provided on each side with membranous expansions), and proliferous (bearing young plants on leaflets) at their apex ; they are borne on erect stems, 4in. to 6in. long, naked or slightly scaly. The pinnæ (leaflets), 3in. to 4in. long and nearly



Adiantum Bausei

(¼ nat. size).

1in. broad, are very variable, some being nearly entire, while others are cut half-way down to the midrib of the blunt lobes, the upper side frequently auricled (eared), the lower one obliquely truncate (terminating abruptly), and dark green. The fertile fronds, besides being narrower, are on a longer spike, with roundish or oblong pinnæ, often distinctly stalked. This is a free-growing species, native of various parts of India, from the Himalayas to Hong-Kong, Ceylon, the Malaccas and Philippine Islands, and, according to Beddome, it is found growing in moist forests, at no great elevation, in the Anamallays, Neilgherries, &c.—*Hooker*, *Species Filicum*, v., p. 251. *Beddome*, *Ferns of Southern India*, t. 194; *Ferns of British India*, t. 110. *Nicholson*, *Dictionary of Gardening*, i., p. 18.

A. (Polybotrya) articulatum—Pol-yb-ot′-rÿ-a; ar-tic-ul-a′-tum (jointed), *Hooker.*

A very strong-growing stove species, native of the Philippine Islands.—*Hooker*, *Synopsis Filicum*, p. 413.

A. (Polybotrya) aspidioides — Pol-yb-ot′-rÿ-a; as-pid-ĭ-ŏ-i′-dēs (Aspidium-like), *Baker.*

A distinct stove species, from Cuba, with general habit similar to that of *Nephrodium* (*Lastrea*) *Filix-mas.* The barren fronds, pinnatifid (nearly divided to the midrib) and of a sub-coriaceous (almost leathery) texture, 1ft. high, are borne on stems densely clothed with lanceolate-acuminate (spear-shaped and pointed) scales. The fertile fronds are narrower, doubly pinnatifid, with the lobes fertile on both sides.—*Hooker*, *Synopsis Filicum*, p. 414.

A. (Polybotrya) asplenifolium — Pol-yb-ot′-rÿ-a; as-ple-nif-ol′-ĭ-um (Asplenium-fronded), *Bory.*

A greenhouse species, from the Neilgherries, Anamallays, &c., where, according to Beddome, it grows wild in moist forests, at no great elevation. Its barren and fertile fronds are very dissimilar: the former are pinnate (cut down to the midrib), glabrous (smooth), sometimes viviparous (producing young plants) at their apex; pinnæ (leaflets) twenty-five to forty pairs, opposite or alternate. Fertile fronds much contracted, with leaflets much shorter than those of the sterile ones. Both are produced from a short, creeping, thick rhizome (prostrate stem), and are borne on very scaly stems.—*Beddome, Ferns of Southern India*, t. 195.

A. assurgens—as-sur′-gens (ascending), *Baker*.

A species of small dimensions, native of the Andes of New Granada, Ecuador.—*Hooker, Synopsis Filicum*, p. 409.

A. Aubertii—Au-ber′-tĭ-i (Aubert's), *Desvaux*.

This very distinct and well-marked stove species, in the way of the commoner *A. viscosum*, from which, however, it differs in texture and clothing (coating of its fronds), is a native of Bourbon, Natal, Guatemala, Venezuela, &c. The barren fronds, 1ft. or more in length, are borne on stems 4in. to 6in. long, clothed with squarrose (rough), linear (much longer than broad), brown scales; the fertile ones, only 2in. to 3in. long, are suddenly narrowed at the base, and borne on stems 6in. to 9in. long. They are produced on a woody, short-creeping, prostrate stem, densely covered with scales similar to those clothing the stems. See Plate.—*Hooker, Species Filicum*, v., p. 219.

A. (Chrysodium) aureo-nitens — Chry-so′-dĭ-um; au′-rĕ-ŏ-nit′-ens (golden-shining), *Hooker*.

A stove species from Galapos, very distinct on account of the singular combination of an entire (uncut), spathulate (spoon-shaped) barren frond, with a pinnate (divided to the midrib) fertile one.—*Hooker, Synopsis Filicum*, p. 421.

A. (Chrysodium) aureum — Chry-so′-dĭ-um; au′-rĕ-um (golden), *Linnæus*.

One of the best and most distinct of all known Acrostichums. From an erect caudex (stem) the massive fronds of this noble, strong-growing Fern, which is found in a wild state in swampy places all over the tropics of both hemispheres, are produced abundantly. They are borne on strong, erect stems, 1ft. to 2ft. high, and their leafy portion frequently measures 4ft. to 5ft. in length; they are of a coriaceous (leathery) texture, and of a particularly brilliant and pleasing green colour, pinnate (divided to the midrib), with barren and usually stalked pinnæ (leaflets) 3in. to 9in. long, and sometimes 3in. broad. The fructification in this highly decorative species is limited to the upper leaflets, which are only a little smaller than the barren ones, and densely sporangiferous (bearing spore-cases) on their under-side. See Fig. 22.—*Hooker, Species Filicum*, v., p. 226. *Beddome, Ferns of Southern India*, t. 204. *Eaton, Ferns of North America*, t. 58. *Lowe, Ferns British and Exotic*, vii., t. 62. *Nicholson, Dictionary of Gardening*, i., p. 18.

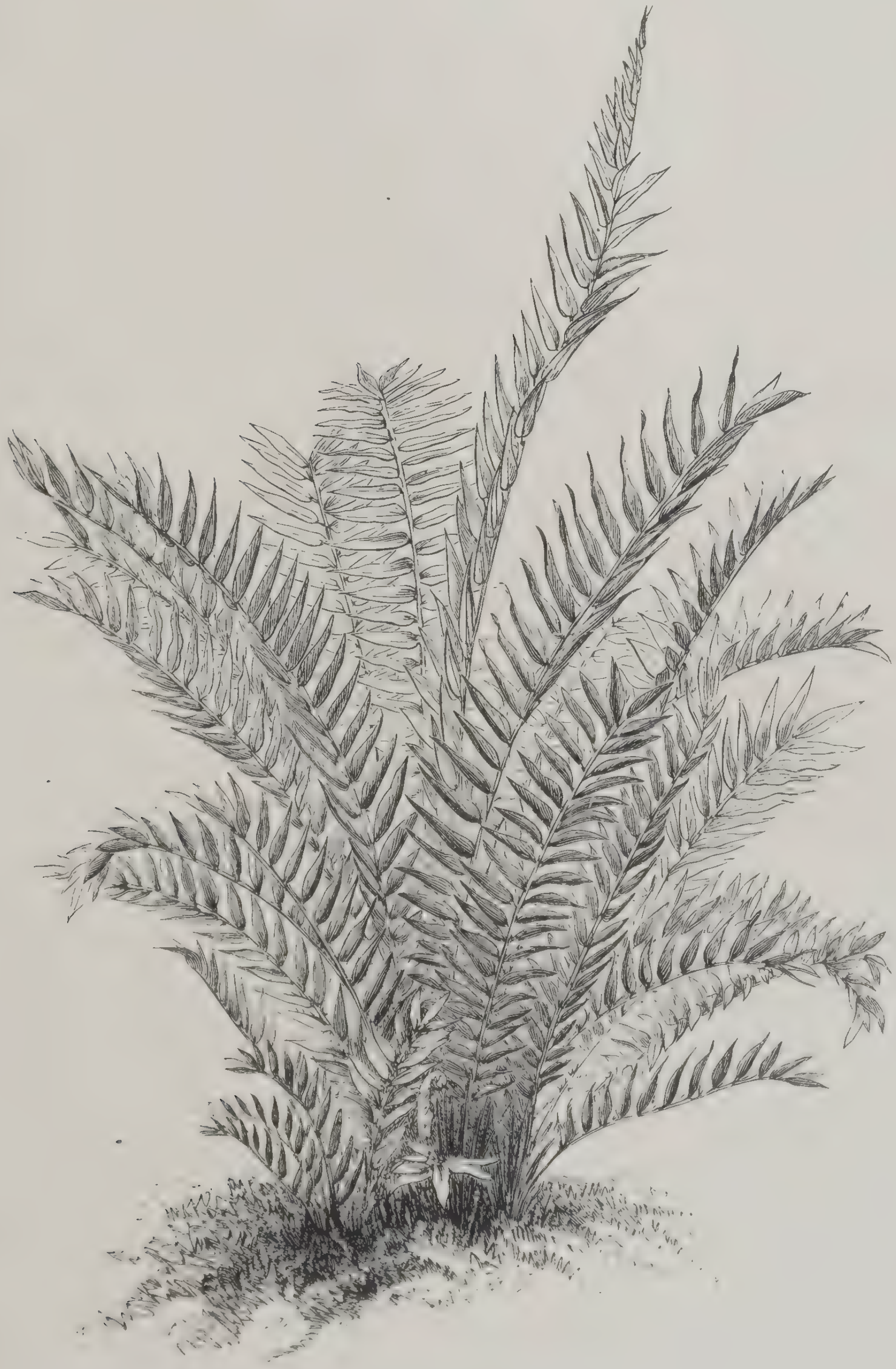


Fig. 22. Acrostichum aureum

($\frac{1}{10}$ nat. size).

To obtain its full development, this handsome evergreen species requires the temperature of the warm-house, where it should be treated as an aquatic.

It should be potted in equal parts of fibrous peat and loam, and, provided there is abundance of heat in the house, it will make a very striking object if the lower part of the pot can be kept in water. A splendid specimen of it is usually to be seen in the Victoria House at Kew, where it is always the admiration of every beholder.

The interesting and judicious remarks published by Prof. D. C. Eaton, in his splendidly-illustrated work on "Ferns of North America," regarding the very uncommon and extremely peculiar conditions under which this Fern is found in a wild state, being of importance, and likely to promote success in its cultivation, we have thought it advisable to give them here in their entirety. Respecting this species, Eaton, in vol. ii., p. 95, of the above-named work, says: "*Acrostichum aureum* is the largest of all the Ferns of the United States. Captain John Donnell Smith notes that it is often 8ft. to 11ft. high; and Fée gives three mètres as the extreme height. It is found on muddy shores of brackish marshes, creeks, and bayous in Southern Florida, very often associated with the mangrove. It is found in similar places in nearly all tropical regions, and is perhaps the only known Fern which grows only within the influence of salt water. Dr. Garber says that, in ascending the creeks of Southern Florida, this Fern is found as far as the water is brackish, and ceases as soon as the water becomes entirely free from salt. Blume reports that he has seen one form, in the interior of Java, in places full of springs abounding in carbonate of lime and chloride of sodium."

A. auricomum—aur-ic′-om-um (having golden locks), *Kunze.*

A greenhouse species, of botanical interest, native of the Andes, from Columbia to Peru and Mexico.—*Hooker*, *Synopsis Filicum*, p. 410.

A. (Stenosemia) auritum—Sten-os-e′-mĭ-a; au-ri′-tum (eared), *Swartz.*

This stove species, native of the Philippines and the Malay and Solomon Islands, is one of the few Acrostichums producing young plants on the upper surface of their fronds, which spring from a woody caudex (upright stem), and are deltoid in shape (that is to say, like the Greek delta, Δ), and of a papyraceous (papery) texture. The barren ones, borne on stems 6in. to 9in. long, are from 8in. to 12in. each way; their central segment is deeply pinnatifid (the incisions of the pinnæ not extending quite to the stem or rachis), with spear-shaped, entire (uncut) lobes, the lateral ones of which are unequal-sided, with elongated-lobed lower pinnules (leafits), which do not reach quite down to the rachis. The fertile fronds, also deltoid in shape, are borne on stems 1ft. to 1½ft. long, but their distant, linear (considerably longer than wide) pinnæ are barely ½in. broad, the upper ones simple (without distinct ramifications), the lower ones pinnatifid (divided half-way to the midrib). The proliferous character of the plant is shown by a pair of bulbils disposed at the base of the lower pinnæ of the barren fronds.—*Hooker, Species Filicum*, v., p. 257. *Lowe, Ferns British and Exotic*, vii., tt. 52, 53. *Nicholson, Dictionary of Gardening*, i., p. 18.

A. (Chrysodium) axillare — Chry-so′-dĭ-um ; ax-il-la′-rĕ (axillary), *Cavanilles.*

A greenhouse species, native of the Himalayas, the Neilgherries, and the Philippine and Malay Islands, and one of the most distinct of all those belonging to the narrow-fronded section. From a wide-scandent (long-climbing), slender rhizome (prostrate stem), the fronds, barren and fertile ones equally simple (without distinct ramifications), are produced. The former, borne on short stems, are from 6in. to 18in. long and about 1½in. broad, and have their point somewhat blunt, the edge uncut, and their lower half gradually tapering to the base. Their texture is papyraceous (papery), and both their surfaces are naked (destitute of hairs or down). The fertile fronds, from 6in. to 12in. long, and from one line to three lines broad, and flexuose (bending to and fro in opposite directions), are borne on stems from 1in. to 6in. long.—*Hooker, Species Filicum*, v., p. 276. *Nicholson, Dictionary of Gardening*, i., p. 19.

A. Barteri—Bar′-ter-i (Barter's), *Baker.*

This stove species, although more recently found in New Guinea, was originally discovered in Sierra Leone, by Barter, in 1816. It is of little horticultural interest.—*Hooker, Synopsis Filicum*, p. 519.

A. Bellermanianum—Bel-ler-man-ĭ-a′-num (Bellerman's), *Klotzsch.*

A greenhouse species, native of Columbia and Ecuador, much in the way of *A. conforme* (con-for′-mĕ) as regards habit and texture, with barren fronds of small dimensions, seldom exceeding 6in. long by 1½in. broad, borne on firm, erect stipes (stalks) 3in. to 6in. long, and densely clothed with large scales of a pale brown colour. These barren fronds are very blunt at the point and rounded at the base; they are of a coriaceous (leathery) texture, and are covered on both sides with scales of a furfuraceous or mealy nature. The fertile fronds, which are borne on longer stalks than the barren ones, are much narrower, but, like them, are produced from a rhizome (prostrate stem) of a woody nature, and are densely covered with linear (long and very narrow), glossy scales of a reddish-brown colour.—*Hooker*, *Species Filicum*, v., p. 236.

A. (Chrysodium) bicuspe—Chry-so′-dĭ-um; bic-us′-pĕ (having two points), *Hooker*.

In this very curious stove species, native of Java, Formosa, and the Loo-Choo Islands, the barren and fertile fronds are produced from a woody, short-creeping rhizome (prostrate stem), densely clothed with yellowish, silky hairs. They are of coriaceous or leathery texture, and differ from each other inasmuch as the barren ones, borne on firm, naked stems, 1ft. long, are rounded at the base, their apex consisting of two broad, divaricated (branching off at a high angle, and spreading irregularly in various directions), acuminate (ending in a long taper-point) lobes, with a broad, rounded sinus (depression) between them, and frequently measure 6in. in their entire portion; whereas the fertile ones, borne on stipes (stalks) 1½ft. or more high, though from 6in. to 9in. long, are barely ½in. broad, and narrowed at both ends, with two or three nearly parallel ribs extending from the apex to the base.—*Hooker*, *Species Filicum*, v., p. 271.

A. (Polybotrya) bifurcatum—Pol-yb-ot′-rў-a; bif-ur-ca′-tum (twice forked), *Swartz*.

The fronds of this greenhouse species, native of St. Helena, are borne on dense, tufted, slender, naked stipes (stalks), 2in. to 4in. long, and seldom exceed 4in. in length. The barren ones, of herbaceous (soft or succulent) texture, have their lower pinnæ usually two- or three-cleft, with linear divisions, and naked on both sides.—*Hooker*, *Species Filicum*, p. 209. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. (Chrysodium) Blumeanum — Chry-so′-dĭ-um ; Blu-mĕ-a′-num (Blume's), *Hooker*.

This greenhouse species, named also by Blume *Leptochilus lomarioides* (Lep-toch-i′-lus lo-ma-rĭ-ŏ-i′-dēs), is a native of Assam, Java, Samoa, and the Philippine Islands, where it is found growing on trees, of the bark of which its thick, wide-climbing rhizomes (long prostrate stems), of a woody nature, readily take possession. Its barren fronds, which measure from 2ft. to 3ft. in length and about 1ft. in breadth, are borne on scaly stipes (stalks) not more than 6in. long, and are furnished on each side with numerous pinnæ (leaflets) of a membranous or soft texture ; these are sessile, or without a stalk, and from 4in. to 6in. long, with their extremity acuminate (tapering to a point) ; they have their edge slightly toothed, and their base rounded. The fertile fronds are equally pinnate (divided to the midrib) ; but the pinnæ, 4in. to 8in. broad, are less closely set, and never more than ¼in. broad.—*Hooker*, *Species Filicum*, v., p. 268. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. Boryanum—Bo-rȳ̆-a′-num (Bory's), *Fée*.

A West Indian, stove species of botanical interest, with barren fronds often 1ft. long and 2in. broad, and fertile ones much smaller, but borne on longer stalks.—*Hooker*, *Synopsis Filicum*, p. 407.

A. Burchellii—Bur-chel′-lĭ-i (Burchell's), *Baker*.

In this Brazilian, greenhouse species, of little decorative value, the barren fronds, of leathery texture, often attain 2ft. in length and 1in. in breadth, while the fertile ones are of much smaller dimensions.—*Hooker*, *Synopsis Filicum*, p. 401.

A. (Polybotrya) canaliculatum — Pol-yb-ot′-rȳ̆-a ; can-a-lic-ul-a′-tum (channelled), *Hooker*.

This gigantic species, native of Venezuela, which succeeds equally well under either stove or greenhouse treatment, is of a particularly well-developed, scandent (climbing) habit, and well adapted for running up a Tree Fern stem, or for covering the stump of a dead tree. Its barren fronds, which are produced from a wide-climbing rhizome (long prostrate stem) of a woody nature, covered with spines or short scales, are of a dark glossy green colour, and of a sub-coriaceous (leathery) texture, and which frequently attain from 3ft. to 4ft. in length and 1½ft. in breadth, are tripinnate (three times pinnate), and borne on stalks 1ft. or more in length. The lower barren pinnæ (leaflets) usually measure from 6in. to 9in. in length and quite 4in. in breadth, and are furnished with numerous lanceolate (spear-shaped) pinnules (leafits), borne on short stalks, and whose segments or subdivisions are naked on both surfaces. The segments of the fertile pinnules, barely ¼in. long, spread at right angles, and bear three or four sessile (stalkless) balls of sori (clusters of spore-cases).—*Hooker*, *Species Filicum*, v., p. 247. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

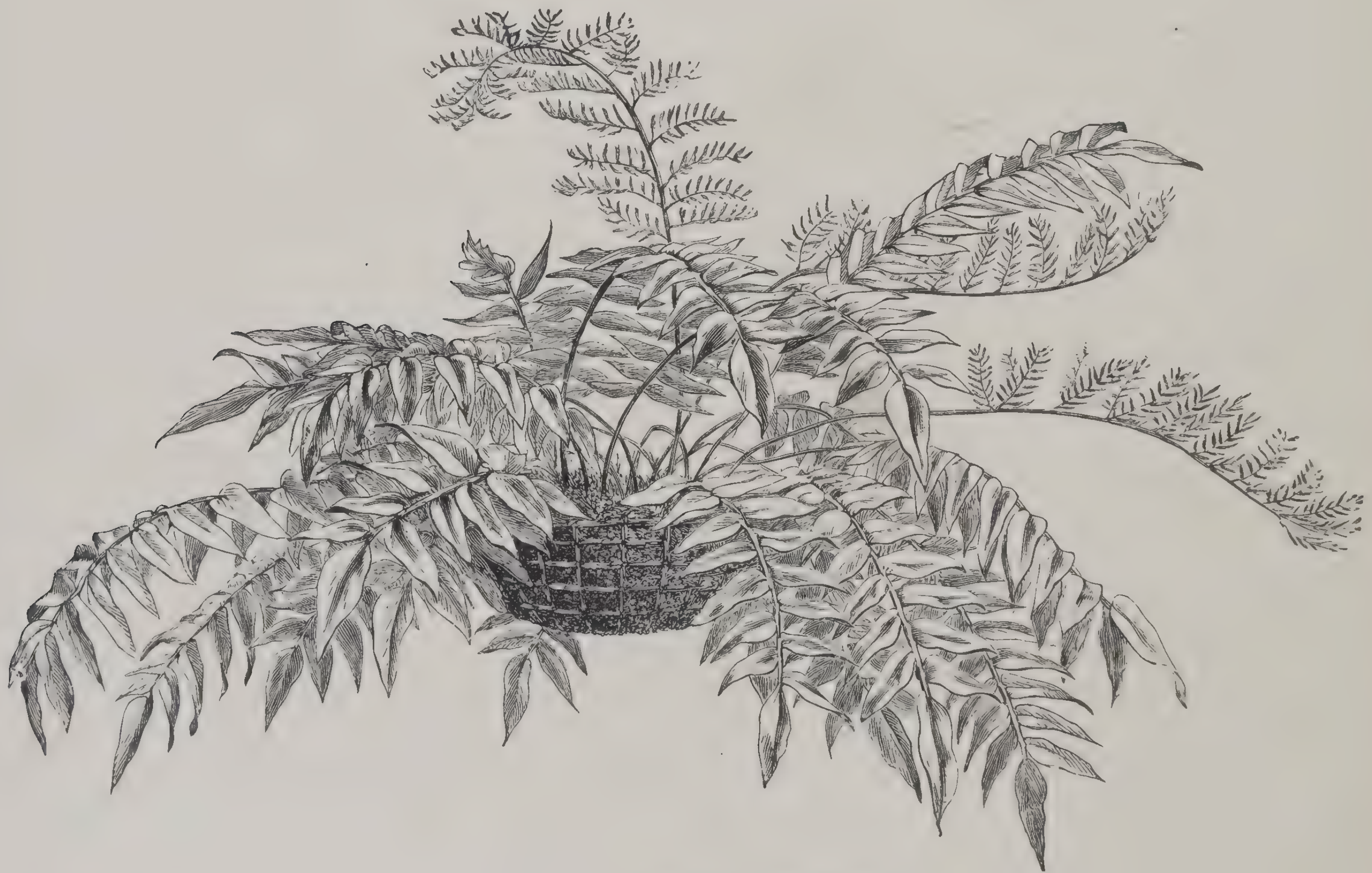


Fig. 23. Acrostichum cervinum
($\frac{1}{10}$ nat. size).

A. cardiophyllum — car-dĭ-oph-yl′-lum (having heart-shaped fronds), *Hooker*.

A dwarf-growing, greenhouse species, native of the Andes of Quito, and one of botanical interest only, as its barren fronds, including the stalks on which they are borne, are seldom more than 2½in. long, and not more than ⅔in. broad.—*Hooker*, *Synopsis Filicum*, p. 405.

A. (Olfersia) cervinum—Ol-fer′-sĭ-a ; cer-vi′-num (stag-horn-like), *Swartz.*

In this truly handsome, stove species, whose habitat extends from Cuba and Mexico to South Brazil and Peru, the barren and fertile fronds are entirely dissimilar. The former, simply pinnate (divided to the midrib), are produced in great abundance from a creeping rhizome (prostrate stem) of a woody nature, and thickly covered with shining light brown scales ; they are borne on stalks 1ft. or more long, densely clothed with scales similar to those covering the rhizome ; they are of a weeping habit, and measure from 3ft. to 4ft. long, while their pinnæ (leaflets), entire (undivided) or nearly so, of a coriaceous (leathery) texture, and pale shining green in colour, are from 6in. to 9in. long and frequently 2in. broad, and unequal at the base. The fertile fronds are bipinnate (twice pinnate), with pinnæ linear (considerably longer than broad), distant, and furnished with short, spreading pinnules (leafits), entirely covered with sporangia (spore-cases). See Fig. 23.—*Hooker*, *Species Filicum*, v., p. 254. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., tt. 39, 40.

A. ciliatum—cil-ĭ-a′-tum (fringed with hairs), *Presl.*

A greenhouse, Peruvian species, of little decorative value. It has barren fronds 1ft. to 1½ft. long, and smaller fertile fronds, which, however, are borne on longer stalks than the barren ones.—*Hooker*, *Synopsis Filicum*, p. 406.

A. cinnamomeum—cin-nam-o′-mĕ-um (cinnamon-coloured), *Baker.*

The fertile fronds of this greenhouse species, native of the Cameroon Mountains and Fernando Po, are seldom more than 10in. long, including the stalks on which they are borne, and which are densely covered with rough scales of a bright brown colour.—*Hooker*, *Synopsis Filicum*, p. 409.

A. (Soromanes) Cœnopteris—So-rom′-an-ēs ; Cœn-op′-ter-is (Cœnopteris), *Kunze.*

This strong-growing, Mexican species, which, although more luxuriant under stove treatment, may be successfully cultivated in the greenhouse, is better adapted for growing on partly-decayed branches of trees than for making pot-specimens. Its rhizomes (prostrate stems), of a woody nature, and densely clothed with long, narrow, rusty-coloured scales, soon take possession of either wood or Tree Fern stem with which they are brought into contact. These trailing stems, as thick as a finger, produce two distinct sorts of fronds, barren and fertile, both of which are borne on straw-coloured stalks, 6in. to 12in. long, scaly below. The barren ones, 2ft. to 3ft. long and about 1ft. broad, are simply pinnate (once divided to the midrib); the pinnæ (leaflets) are of an almost leathery texture, shining green, and frequently measure from 4in. to

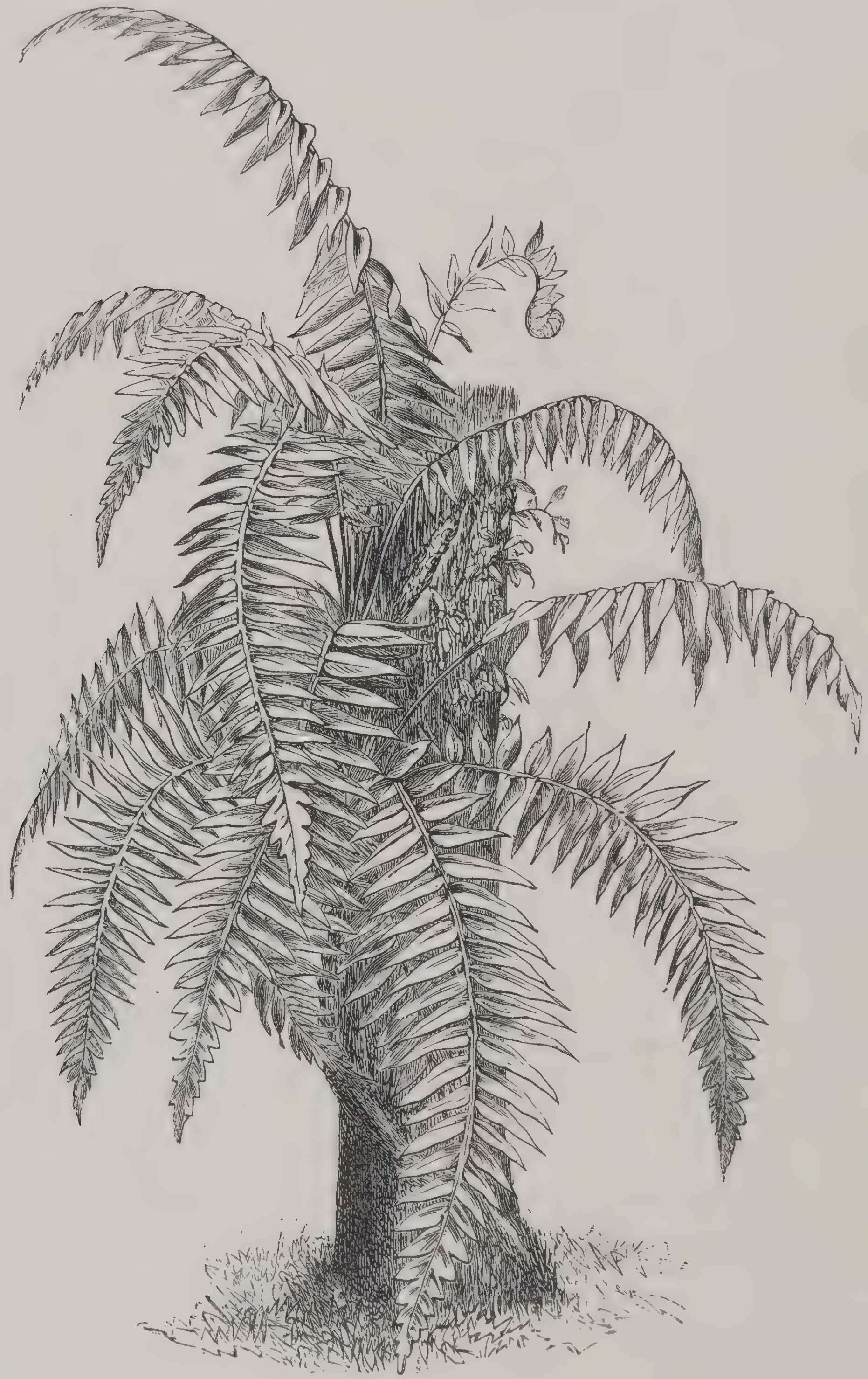


Fig. 24. Acrostichum Cœnopteris
(⅛ nat. size).

8in. long and 1½in. broad; they are entire (uncut) and toothed, especially towards the point. The fertile fronds are smaller, narrower, and bipinnate (twice divided to the midrib). This species, of easy cultivation, is the same as the one known under the name of *Soromanes serratifolium* (So-rom′-an-ēs ser-ra-tif-ol′-ĭ-um), Fée. See Fig. 24.—*Hooker*, *Species Filicum*, v., p. 256.

A. conforme—con-for′-mĕ (symmetrical), *Swartz.*

This is a handsome, evergreen, stove species, of dwarf habit, with very thick, shining fronds, produced from a creeping and scaly rhizome (prostrate stem). The barren ones, which, contrary to the general rule, are narrower than those bearing fructification, are of erect habit, from 6in. to 9in. long, and are borne on short, erect, slightly scaly stalks. To this species—whose habitat extends over a vast area, it being found in Mexico and Brazil, in the Sandwich and Fiji Islands, on the Himalayas and the Neilgherries (where, according to Beddome, it is very common on trees on the higher ranges), at the Cape of Good Hope, &c.—many other kinds are closely related; the principal ones being *A. laurifolium* (laur-if-ol′-ĭ-um), *A. marginatum* (margin-a′-tum), and *A. obtusifolium* (ob-tu-sif-ol′-ĭ-um).—*Hooker*, *Species Filicum*, v., p. 198. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., t. 44. *Beddome*, *Ferns of Southern India*, t. 198.

A. (Hymenodium) crinitum—Hym-en-o′-dĭ-um; cri-ni′-tum (hairy), *Linnæus.*

Of all stove Ferns in cultivation this West Indian species is undoubtedly the most curious, as also, when well grown, one of the handsomest among the numerous forms contained in the genus to which, notwithstanding its peculiar appearance (which reminds one of anything but a Fern), it really belongs. The name of Elephant's-ear Fern, under which it is commonly known, conveys an idea of the extraordinary shape of its fronds; they are simple, entire (undivided), broadly oblong or of an elliptical shape, and produced from a rhizome (prostrate stem) thick, decumbent (reclining on the surface of the ground), of a woody nature, and densely covered with long, black hairs, which are also found on both surfaces, and more abundantly on the margins, of the barren fronds. These are of a leathery, yet succulent, texture, and of a dull green colour; when fully developed, they frequently measure from 1¼ft. to 1½ft. long and from 8in. to 10in. broad. The fertile ones, of similar shape and texture, are smaller and contracted, their edges are turned inwards, and the whole of their under-side, with the exception of a narrow margin, is densely covered with brownish-black sporangia (spore-cases), from which the spores escape at an early date. The barren and fertile fronds are both borne on firm, erect stipes (stalks), 6in. to 8in. long, which are densely clothed with long and very narrow, black silky scales. This interesting Fern is a general favourite. See Fig. 25.—*Hooker*, *Species Filicum*, v., p. 267. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., t. 41.

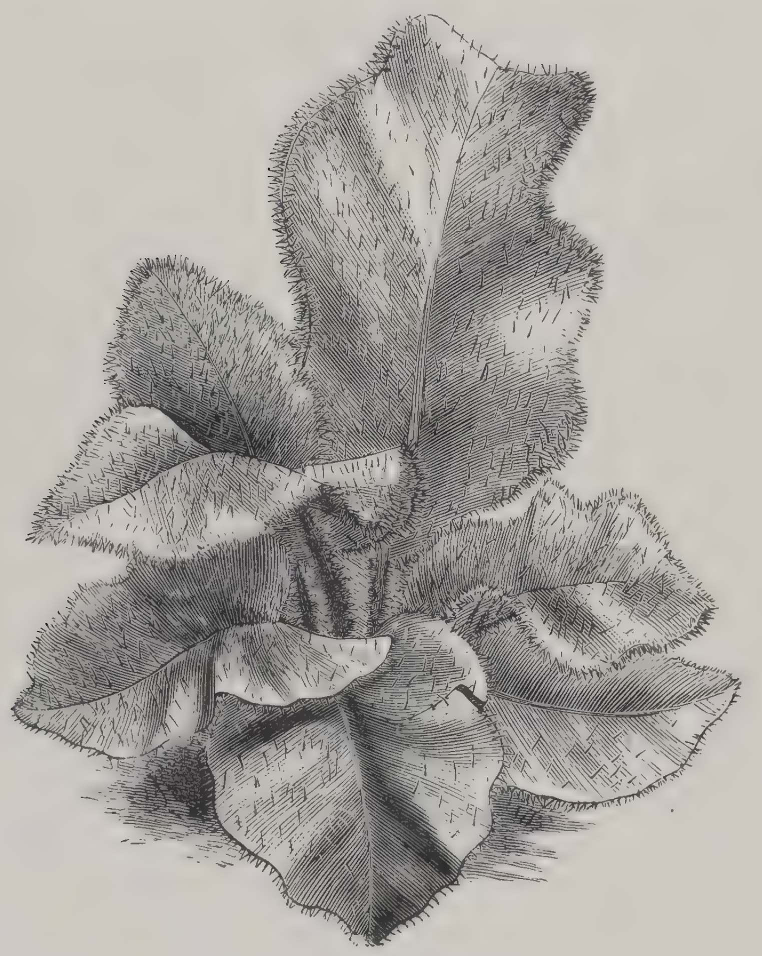


Fig. 25. Acrostichum crinitum
(⅕ nat. size).

A mixture of a spongy nature, composed of two parts peat and one part chopped and partly-decayed sphagnum, is the material which this species prefers; but in such a compost care must be taken that it does not get treated too liberally with water at the roots, as in that case it is not unusual to find its fleshy fronds covered with circular marks, having all the appearance and transparency of oily spots, which gradually extend over their surface, and completely destroy it. This peculiar disease we have not known to affect any other species, except Platyceriums (Plat-yc-er′-ĭ-ums), all of which are subject to it to the same extent; it is invariably due to stagnation at the roots, to which cause many handsome specimens have, to our knowledge, already succumbed. The most efficacious treatment for affected plants consists in entirely removing the soil from the roots, by washing them, and re-potting in a smaller pot; after this operation very little water should be allowed, and even when in good health, unless growing in great heat, plants of *A. crinitum* should be watered only when they show signs of flagging.

A. cubense—cub-en′-sĕ (Cuban), *Mettenius.*

A very dwarf, stove species, of botanical interest only, with barren fronds spathulate (spoon-shaped), of a membranous (almost transparent) texture; including the stalks on which they are borne, they seldom exceed 5in. in length.—*Hooker, Synopsis Filicum*, p. 520.

A. (Chrysodium) cultratum — Chry-so′-dĭ-um; cul-tra′-tum (knife-shaped), *Baker.*

This stove species, native of San Cristoval and the Solomon Islands, where it is found climbing on trees, is one of the most gigantic Acrostichums (Ac-ros′-tich-ums) known in cultivation. Its barren fronds, produced from a wide-creeping or long-trailing rhizome (prostrate stem), attain 6ft. in length, and are furnished with ligulate (strap-shaped) pinnæ (leaflets) measuring from 6in. to 8in. in length and 1½in. in breadth, and which are pinnate (cut down to the midrib), or sometimes are cut down to a narrow wing into undivided, close, blunt lobes, ½in. broad, narrowed to a broad base, which is then wedge-shaped. Both surfaces of the barren fronds, which are of moderately firm texture, are naked and of a bright green colour. The fertile pinnæ are like those of the barren fronds, but more distant, and only about two lines broad.—*Hooker, Synopsis Filicum*, p. 524.

A. Cumingii—Cum-ing′-ĭ-i (Cuming's), *Fée.*

A stove kind, from the Philippines, whose barren fronds, 6in. to 8in. long, are of very thick texture, and have their lower part densely covered with large, ovate (egg-shaped), dull brown scales, similar to those which cover the woody stems from which they are produced.—*Hooker, Synopsis Filicum*, p. 407.

A. cuspidatum—cus-pid-a′-tum (gradually tapering to a short, stiff point), *Willdenow.*

A stove species, of little decorative value, but rendered interesting by the peculiar nature of its barren fronds, from 1ft. to 2ft. long, of a leathery texture, whose upper surface is nearly naked, while the lower one is densely matted with small, ciliated (fringed) scales of a peculiarly furfuraceous (mealy) nature.—*Hooker, Synopsis Filicum*, p. 411.

A. Deckenii—Deck-en′-ĭ-i (Decken's), *Kuhn.*

A greenhouse species, from Mount Kilimanjaro, East Tropical Africa, of botanical interest only, with spear-shaped fronds 9in. to 12in. long and densely clothed below with rusty scales.—*Hooker*, *Synopsis Filicum*, p. 523.

A. decoratum—dec-or-a′-tum (decorative), *Kunze.*

In this handsome stove species, native of the West Indies, Guiana, and Peru, which is totally distinct from all others in cultivation, the barren fronds, 1ft. or more long by 3in. to 4in. broad, are of a coriaceous (leathery) texture and of a bright green colour; they are acute (sharp-pointed) at their extremity, rounded at their base, and their edges are densely fringed with squarrose (rough) scales nearly ¼in. long and of a bright brown colour. The fertile fronds are nearly as large as the others; both are produced from a very stout caudex (trunk), equally furnished with scales of the same bright colour, but fully ¾in. in length.—*Hooker*, *Species Filicum*, v., p. 195.

A. (Stenochlæna) decrescens—Sten-och-læ′-na; de-cres′-cens (decreasing), *Baker.*

A greenhouse species, native of the Cameroon Mountains, West Tropical Africa, with a wide-scandent (long-trailing) rhizome (prostrate stem), on which are disposed the barren fronds of a leathery texture, and about 1½ft. long and 4in. broad, furnished with about forty pinnæ (leaflets) of various lengths on each side, gradually narrowing to mere auricles (ears or rounded appendages) at the base.—*Hooker*, *Synopsis Filicum*, p. 412.

A. decurrens—de-cur′-rens (running down), *Desvaux.*

A stove species, of botanical interest only, native of the Philippines. Its barren fronds, 1ft. or more long, have both sides naked, but their edge is densely fringed with minute dull brown scales.—*Hooker*, *Synopsis Filicum*, p. 403.

A. dendricolum—den-dric′-ol-um (living on trees), *Baker.*

A stove species, of little decorative value, although in the Andes of New Granada trees are covered with its little, lanceolate (spear-shaped) barren fronds, barely 4in. long, thickly fringed with minute, pale brown scales.—*Hooker*, *Synopsis Filicum*, p. 521.

A. (Elaphoglossum) dimorphum—El-aph-og-lōs′-sum ; dim-orph′-um (of two forms), *Hooker*.

This greenhouse species from St. Helena is of botanical interest on account of its being given in the "Synopsis Filicum" as "the only Elaphoglossum having the fronds distinctly incised or crenated." This applies only to the barren fronds, of a leathery texture and about 4in. long, as the smaller fertile ones are nearly entire (uncut).—*Hooker*, *Synopsis Filicum*, p. 406.

A. discolor—dis′-col-or (of two colours), *Kuhn*.

An Amazon, stove, botanical species, with spear-shaped fronds about 4in. long, densely scaly beneath.—*Hooker*, *Synopsis Filicum*, p. 521.

A. (Photinopteris) drynarioides—Pho-ti-nop′-ter-is ; dryn-a′-rĭ-ŏ-i′-dēs (Drynaria-like), *Hooker*.

This stove species, from Penang and the Solomon Islands, is very peculiar on account of its fronds, several feet long and 1ft. or more broad, being sessile (stalkless) ; it also differs from most other known kinds in the upper part of the fronds being furnished with Lomaria-like pinnæ (leaflets) quite 1ft. long, and which, although adnate (attached throughout their length) to the rachis (stalk), break away from it readily. See Fig. 26.—*Hooker*, *Species Filicum*, v., p. 282. *Beddome*, *Ferns of British India*, ii., t. 325.

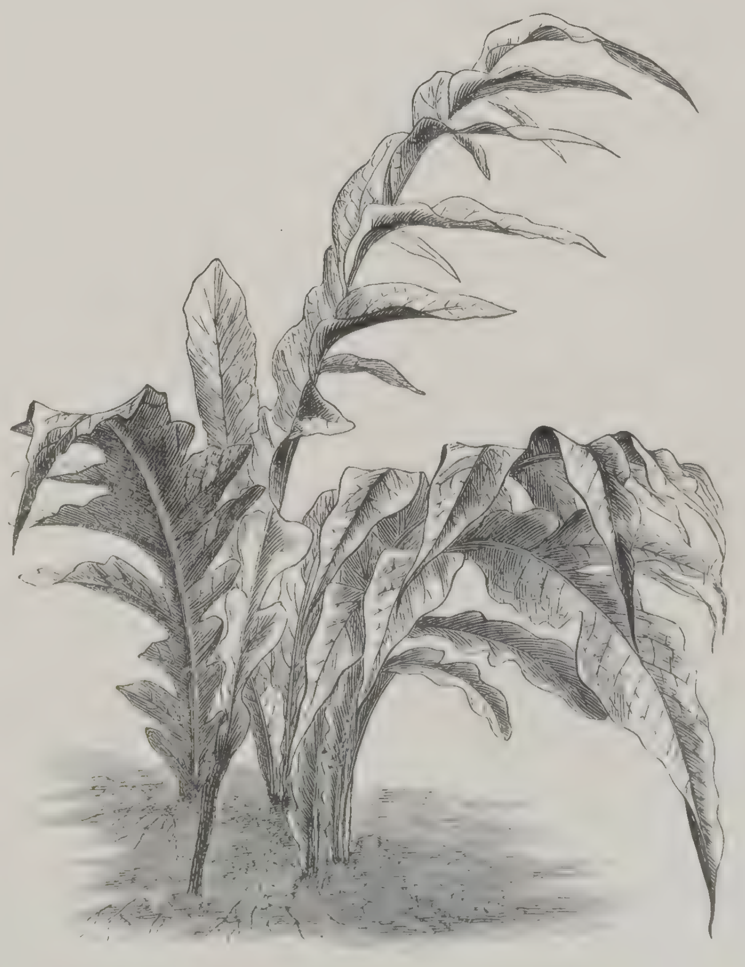


Fig. 26. Acrostichum drynarioides (⅛ nat. size).

A. Feei—Fe′-ĕ-i (Fée's), *Bory*.

A West Indian stove species, of purely botanical interest, with leathery fronds which, including the stalks on which they are borne, seldom exceed 3in. in length.—*Hooker*, *Synopsis Filicum*, p. 404.

A. ferrugineum—fer-ru-gin′-ĕ-um (rust-coloured), *Linden.*

A greenhouse species, of little decorative value, native of the Andes of Columbia, entirely similar in habit to the better-known *A. latifolium* (la-tif-ol′-ĭ-um), but with fronds smaller, bright green on their upper surface, while their under-side is covered with minute scales of a rusty-brown colour. —*Hooker*, *Synopsis Filicum*, p. 522.

A. (Rhipidopteris) flabellatum—Rhi-pid-op′-ter-is ; fla-bel-la′-tum (fan-shaped), *Hooker.*

A stove species of small dimensions, whose habitat extends from New Granada to Peru. Its barren fronds are dichotomously divided (each division again forked in two), and the fertile ones are entire (undivided) and nearly round.—*Hooker*, *Synopsis Filicum*, p. 415.

A. flaccidum—flac′-cid-um (relaxed), *Fée.*

This greenhouse species, native of Panama and North Brazil, though closely related to the very decorative *A. Lechlerianum* (Lech-ler-ĭ-a′-num) and *A. simplex* (sim′-plex), is of botanical interest only. Its barren fronds, which are of a dark green colour on both sides, seldom exceed 9in. in length, including the stalks ; while the fertile ones are shorter still.—*Hooker*, *Synopsis Filicum*, p. 401.

A. (Gymnopteris) flagelliferum—Gym-nop′-ter-is ; flag-el-lif′-er-um (rod-shaped), *Wallich.*

This is a free-growing stove species, native of the East Indies. The barren fronds are of a somewhat succulent texture, and the terminal pinnæ (leaflets), at least 1ft. long, become narrower towards the extremity of the frond, where it becomes proliferous. These barren fronds, which average about 2ft. in length, are borne on stems 6in. to 12in. long, and are usually furnished with three pairs of pinnæ, 3in. to 6in. long and 1in. to 2in. broad, borne on short stalks, undulated or crimped, and of a dull green colour. The fertile fronds are from 1ft. to 1½ft. long, and their pinnæ, 2in. to 3in. long, are seldom more than ½in. in breadth. Both are produced from a creeping, scaly rhizome (prostrate stem) of a woody nature. See Fig. 27.—*Hooker*, *Species Filicum*, v., p. 258. *Nicholson*, *Dictionary of*

Gardening, i., p. 19. *Lowe, Ferns British and Exotic*, vii., t. 63. *Beddome, Ferns of British India*, t. 112.

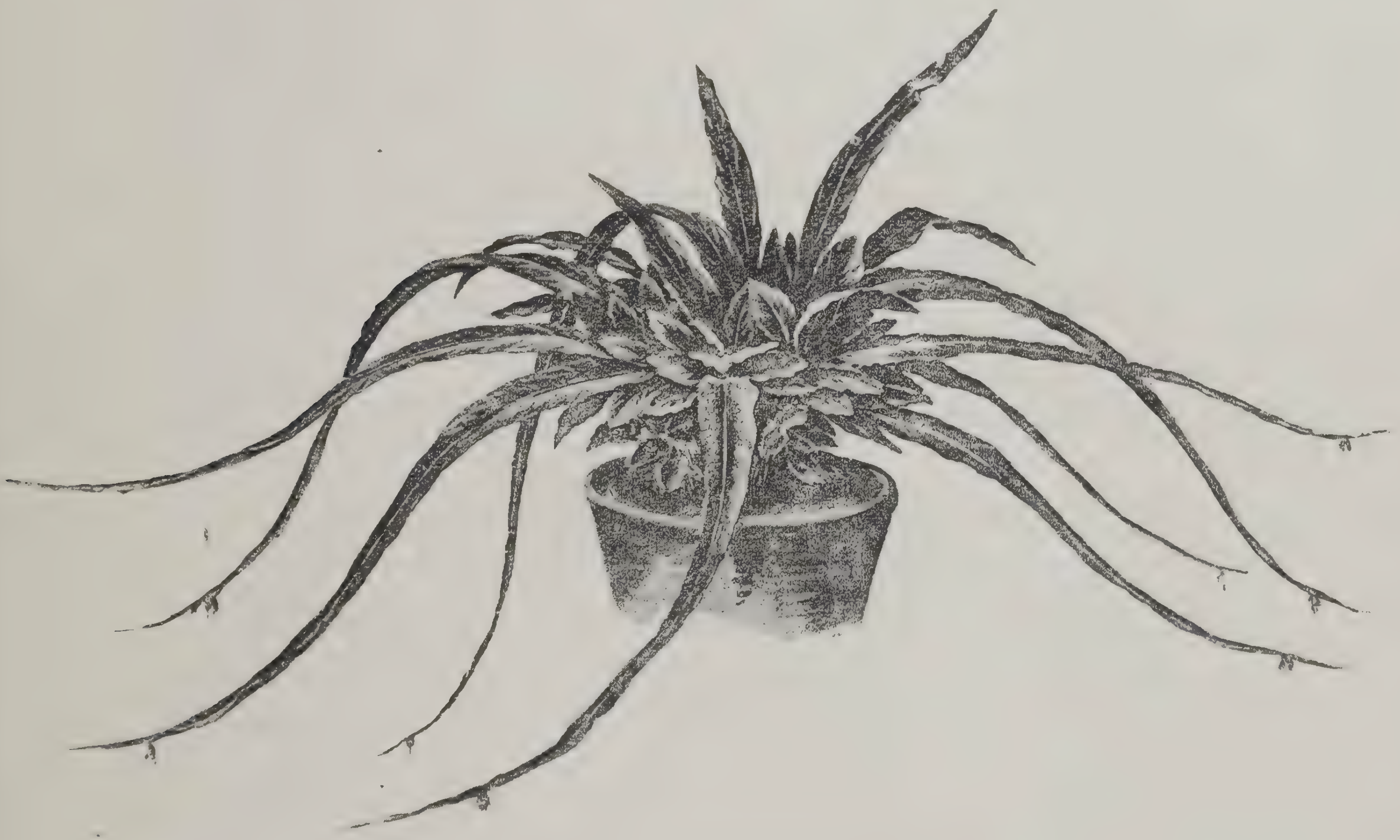


Fig. 27. Acrostichum flagelliferum
($\frac{1}{10}$ nat. size).

A. (**Chrysodium**) **fluviatile**—Chry-so′-dĭ-um ; fluv-ĭ-a′-til-ĕ (floating), *Hooker.*

A stove species of little decorative value, native of the Guinea Coast. Its fronds—of a thin, papery texture, 1ft. to 2ft. long, borne on stalks 1ft. to 1¼ft. long—are produced from a firm, wide-creeping or long-trailing rhizome (prostrate stem).—*Hooker, Synopsis Filicum*, p. 422.

A. (**Rhipidopteris**) **fœniculaceum**—Rhi-pid-op′-ter-is ; fœ-nic-ul-a′-cĕ-um (Fennel-leaved), *Hooker.*

A stove species of small dimensions, native of Ecuador, and closely connected with *A. flabellatum* (fla-bel-la′-tum) and the better-known *A. peltatum* (pel-ta′-tum). The dichotomous (repeatedly-forked) character peculiar to these species it also shares to a smaller degree.—*Hooker, Species Filicum*, v., p. 253. *Nicholson, Dictionary of Gardening*, i., p. 19.

A. Fraseri—Fra′-ser-i (Fraser's), *Mettenius.*

A dwarf, greenhouse species, of purely botanical interest, native of the Andes of Columbia and Ecuador. It has fronds entire (uncut), of a subchartaceous (parchment-like) texture, about 2in. long, and covered on both surfaces with red-brown bristles.—*Hooker*, *Synopsis Filicum*, p. 520.

A. furfuraceum—fur-fur-a′-cĕ-um (scurfy), *Mettenius.*

A stove species, native of Costa Rica, of little decorative value, but very peculiar through the nature of its short fronds, which are entirely covered on both surfaces with scales, rigid, and of a reddish-brown colour, except on the midrib, where they are very nearly black.—*Hooker*, *Synopsis Filicum*, p. 523.

A. (Gymnopteris) gaboonense — Gym-nop′-ter-is ; gab-oon-en′-sĕ (native of Gaboon), *Hooker.*

A stove, botanical species, from the Guinea Coast, with barren fronds about 1ft. long, sometimes proliferous (producing young plants) at their extremity, and fertile ones much smaller.—*Hooker*, *Synopsis Filicum*, p. 417.

A. (Elaphoglossum) Gardnerianum—El-aph-og-lōs′-sum ; Gard-ner-ĭ-a′-num (Gardner's), *Fée.*

The barren fronds of this greenhouse species, native of Brazil and Venezuela, seldom exceed 8in. in length, including the firm, erect stems on which they are borne, and which, like the upper surface of the blade itself, are densely clothed with large scales of a mealy nature and pale brown colour. —*Hooker*, *Species Filicum*, v., p. 233. *Lowe*, *Ferns British and Exotic*, vii., t. 58.

A. glabratum—glab-ra′-tum (smooth), *Mettenius.*

A dwarf, stove species of purely botanical interest, native of New Caledonia, with barren fronds spathulate (spoon-shaped), about 2in. long, and fertile ones linear (long and very narrow), 4in. to 5in. long, and only two lines broad.—*Hooker*, *Synopsis Filicum*, p. 518.

A. (Aconiopteris) gorgoneum — Ac-on-ĭ-op′-ter-is ; gor-go′-ne-um (Gorgon-like), *Kaulfuss.*

A stove species of little decorative value, native of the Sandwich and Society Islands. Its barren fronds are nearly stalkless, entire (uncut), and vary from 6in. to 15in. in length, while the fertile ones, though smaller and narrower, are borne on erect stalks 6in. or more long.—*Hooker*, *Synopsis Filicum*, p. 416.

A. gratum—gra′-tum (pleasing), *Fée.*

This greenhouse, Mexican species is of botanical interest only. Its barren fronds, about 8in. long, are borne on stalks of equal length; whereas the fertile fronds, while smaller, are borne on longer stalks.—*Hooker*, *Synopsis Filicum*, p. 521.

A. (**Gymnopteris**) **Harlandii**—Gym-nop′-ter-is; Har-lan′-dĭ-i (Harland's), *Hooker.*

A stove species, native of Hong-Kong and Formosa, and one which, when well grown, makes a very handsome specimen, although its barren fronds are usually entire (uncut). These are borne on firm, glossy stipes (stalks) 1ft. to 1½ft. long, of chestnut-brown colour, and scaly at the base; they frequently show a spathulate (spoon-shaped), terminal pinna (leaflet) sometimes 1ft. long by 3in. broad, besides one or two of similar shape, but of smaller dimensions, on each side, usually connected at the base, all of a coriaceous (leathery) texture. The fertile fronds are similar in shape to the barren ones, but are provided with much smaller pinnæ.—*Hooker*, *Species Filicum*, v., p. 274.

A. Herminieri—Her-min-ĭ-e′-ri (Herminier's), *Bory.*

This stove species, whose habitat extends from Cuba to Brazil, is very handsome, and easily distinguished from all others through the striking appearance resulting from its two very dissimilar kinds of fronds. Its barren ones, which are sword-shaped, and measure from 2ft. to 3ft. in length and about 1½in. in breadth, are of a coriaceous (leathery) texture, and they terminate in a long, taper point, while their lower part is very gradually narrowed; both their surfaces are naked, but the upper one has quite a peculiar metallic gloss. The fertile fronds are small, seldom measuring more than 4in. long, and sub-sessile (short-stalked). The rhizome (prostrate stem) on which the fronds are produced is stout, short-creeping, and of a woody nature, densely covered with linear (much longer than wide) scales of a reddish-brown colour and quite 1in. in length.—*Hooker*, *Species Filicum*, v., p. 216. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. heterolepis—het-er-ol′-ep-is (having different scales), *Baker.*

A stove, Brazilian species of purely botanical interest, with small, oblong-lanceolate (elliptically spear-shaped) fronds, the under-side of which is densely clothed with spreading scales of a pale brown colour.—*Hooker*, *Synopsis Filicum*, p. 521.

A. (Elaphoglossum) heteromorphum—El-aph-og-lŏs′-sum; het-er-om-or′-phum (variŏus-formed), *Klotzsch.*

This dwarf-growing, stove species, native of Columbia and Ecuador, although of little decorative value, is particularly interesting through its barren fronds—only 2in. long by nearly 1in. broad, and borne on short, slender stems—being simple (without distinct ramifications), rounded at the base, and having scattered over both surfaces linear (much longer than wide) scales, of a peculiar chestnut colour. Its fertile fronds, of smaller dimensions, are, like the barren ones, disposed on a slender, wide-creeping or long-trailing rhizome (prostrate stem).—*Hooker*, *Species Filicum*, v., p. 224. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. (Chrysodium) Heudelotii—Chry-so′-dĭ-um; Heu-de-lot′-ĭ-i (Heudelot's), *Hooker.*

A stove species from Senegambia and Sierra Leone, whose barren fronds, 1ft. to 1½ft. long by 6in. to 10in. broad, are furnished with numerous erecto-patent (upright-spreading) pinnæ (leaflets) on each side, 3in. to 6in. long, and narrowed to both ends. These fronds, of a coriaceous or leathery texture, are borne on firm, erect, naked stipes (stalks), 6in. to 9in. long, and proceed from a wide-creeping or long-trailing rhizome (prostrate stem) of a woody nature.—*Hooker*, *Species Filicum*, v., p. 264.

A. hybridum—hyb′-rid-um (hybrid), *Bory.*

This stove species, native of the Mascarene Islands, the Cameroon Mountains, Fernando Po, &c., appears to be identical with the Brazilian plant known as *A. Linbergii* (Lin-berg′-ĭ-i), of Mettenius. Its barren fronds, 6in. to 12in. long and about 2in. broad, have their base somewhat rounded, and terminate in a tapering point ; they are of a sub-coriaceous (almost leathery) texture, with both surfaces naked, except the midrib beneath, but their edge is abundantly furnished with subulate (awl-shaped) scales. The fertile fronds are much smaller than the barren ones, but both kinds are borne on firm, erect, scaly stipes (stalks), 6in. to 9in. long, proceeding from a rhizome (prostrate stem) of a woody nature, and densely clothed with linear (much longer than wide), crisped scales, of a peculiar dark chestnut-brown colour.—*Hooker*, *Species Filicum*, v., p. 210.

A. laminarioides—la-min-a′-rĭ-ŏ-i′-dēs (Laminaria-like), *Bory.*

This strong-growing, stove species, native of Guiana, is very closely related to *A. cuspidatum* (cus-pid-a′-tum) of Willdenow, but the upper surface of its barren fronds, instead of being naked, is thinly, and its lower surface densely, coated with minute, ciliated (fringed with hairs) scales, of a grey colour, with a brown dot in the centre. These fronds, which are entire (undivided), and lanceolate (tapering to both ends), frequently attain 2ft. in length and 1½in. in breadth ; they are borne on grey stipes (stalks), 6in. to 9in. long, of a furfuraceous (scurfy) nature, which are produced from a stout, short-creeping, woody rhizome (prostrate stem), covered with firm, linear (much longer than wide), brown-black scales.—*Hooker*, *Species Filicum*, v., p. 235.

A. (Chrysodium) lanceolatum — Chry-so′-dĭ-um ; lan-cĕ-ol-a′-tum (spear-shaped), *Hooker.*

A stove species of botanical interest, native of the Philippine Islands, Ceylon, &c.—*Hooker*, *Synopsis Filicum*, p. 420.

A. (Elaphoglossum) latifolium — El-aph-og-lōs′-sum ; la-tif-ol′-ĭ-um (broad-leaved), *Swartz.*

This stove species, to which *A. Blanchettii* (Blan-chet′-tī-i), *A. callæfolium* (cal-læ-fol′-ĭ-um), *A. longifolium* (long-if-ol′-ĭ-um), and *A. torarense* (to-va-ren′-sĕ), are so closely related as to be now admitted as simple varieties of it, has a most extensive habitat, for it is found from Mexico and Cuba to Brazil and Peru, also in Java, and specimens received from the Seychelles probably belong to the same species. Its barren fronds, 1ft. to 1½ft. long and 3in. to 4in. broad, of a very coriaceous (leathery) texture, are simple (without distinct ramifications), and terminate in a point, while their lower part is narrowed gradually. They are borne on firm, erect, stramineous (straw-coloured) stipes (stalks), naked or slightly scaly. The fertile fronds, of similar shape, are considerably narrower than the barren ones, but both are produced from a thick, creeping rhizome (prostrate stem), of a woody nature, furnished with lanceolate (spear-shaped), crisped scales, of a light brown colour.—*Hooker*, *Species Filicum*, v., p. 202. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., t. 51.

A. (Stenochlæna) laurifolium—Sten-och-læ′-na ; laur-if-ol′-ĭ-um (Laurel-leaved), *Hooker*.

This handsome, stove species, native of the Philippines and the Solomon Islands, must not be confounded with Du Petit Thouars' *A. laurifolium*, figured in Lowe's "Ferns, British and Exotic," vii., t. 59. This latter plant, with simple (undivided) fronds of small dimensions, is now admitted as a simple form of *A. conforme* (con-for′-mĕ) of Swartz, previously described. Hooker's *A. laurifolium*, on the contrary, is a Fern of somewhat gigantic growth and of great decorative value, with fronds pinnate (divided to the midrib), and reaching 3ft. in length by about 1½ft. in breadth. Its barren pinnæ (leaflets), of a leathery texture, are from 6in. to 9in. long, and fully 1½in. broad ; they are gradually narrowed from their heart-shaped base to their extremity, and have a sharply- but finely-toothed edge. The fertile pinnæ are a little longer than the barren ones, but seldom more than ¼in. in breadth, the lower ones being from 1in. to 2in. apart. It bears a certain resemblance to the more popular *A.* (*Stenochlæna*) *scandens* (scan′-dens), but is of larger dimensions, and its pinnæ are not articulated (jointed). The greatest difference, however, is found in its habit, as its fronds are produced from a firm, erect, naked stem ; whereas those of *A. scandens* proceed from a rhizome (prostrate stem) of a wide-creeping nature.—*Hooker*, *Species Filicum*, v., p. 251.

A. (Polybotrya) Lechlerianum—Pol-yb-ot′-rў-a ; Lech-ler′-ĭ-a′-num (Lechler's), *Hooker*.

This is a very handsome stove species, from Peru and Ecuador, with fronds 3ft. to 4ft. long and 1ft. to 1½ft. broad, quadripinnatifid (four times divided to the stalk); the lower pinnæ (leaflets), 6in. to 9in. long and 4in. to 5in. broad, are furnished with close, lanceolate (spear-shaped) pinnules (leafits) deeply lobed or cut nearly down to the rachis (stalk), which is pubescent. These barren fronds are of a coriaceous (leathery) texture, naked on both surfaces, and are borne on firm, erect stipes (stalks) 9in. to 12in. long, scaly downwards. The fertile pinnules are narrower and more distant (set further apart); their segments are oblong or elliptical and cylindrical, and have a space between them, the lower ones being rather beaded (round and close together). The rhizome (prostrate stem), from which the fronds are produced, is wide-creeping or long-trailing, scaly, and of a woody nature. — *Hooker*, *Species Filicum*, v., p. 246. *Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. (Elaphoglossum) lepidotum—El-aph-og-lōs′-sum; lep-id-o′-tum (scaly), *Willdenow.*

A stove species of tropical American origin, and which is possessed of only botanical interest; its small, leathery barren fronds seldom reaching over 8in. in length, including the stalks on which they are borne, and which are firm and scaly throughout. Its fertile fronds are similar to the others, but are borne on longer stalks.—*Hooker*, *Species Filicum*, v., p. 238. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. (Elaphoglossum) leptophyllum—El-aph-og-lōs′-sum; lep-toph-yl′-lum (thin-leaved), *Fée.*

A stove species, native of Brazil, and of purely botanical interest. It is characterised by the ligulate (strap-shaped) form of its coriaceous (leathery) fronds, which are borne on stalks 3in. to 4in. long, and of its fertile ones, which are provided with stalks three or four times as long.—*Hooker*, *Synopsis Filicum*, p. 400.

A. (Elaphoglossum) Lindeni—El-aph-og-lōs′-sum; Lin′-den-i (Linden's), *Bory.*

This curious little stove species, which is found in most parts of tropical America, from Mexico to Ecuador and Brazil, although of very little decorative value, is peculiar on account of its leathery fronds, barren and fertile, being much smaller than the stalks on which they are borne, and which are of a very slender nature.—*Hooker*, *Synopsis Filicum*, p. 404.

A. (Chrysodium) Lindigii—Chry-so′-dĭ-um ; Lin-dig′-ĭ-i (Lindig's), *Baker*.

A stove species, native of New Granada, with fronds 2ft. long, 1ft. broad, and furnished with barren pinnæ (leaflets) 6in. to 8in. long and about 1½in. broad, and fertile pinnæ distant (set far apart), 4in. to 5in. long, but only ¼in. broad, entire (uncut), and gradually narrowed upwards.—*Hooker*, *Synopsis Filicum*, p. 423.

A. (Elaphoglossum) lineare—El-aph-og-lōs′-sum ; li-nĕ-a′-rĕ (narrow), *Fée*.

A greenhouse, Brazilian Fern, of purely botanical interest, much in the way of the already-described *A. Aubertii* (Au-ber′-tĭ-i).—*Hooker*, *Synopsis Filicum*, p. 406.

A. (Elaphoglossum) Lingua—El-aph-og-lōs′-sum ; Lin′-gua (tongue-like), *Raddi*.

This stove, West Indian species, with a firm, wide-creeping or long-trailing rhizome (prostrate stem), covered with small, ovate (egg-shaped) scales of a dark brown colour, differs from the better-known and already-described *A. latifolium* (la-tif-ol′-ĭ-um) mainly through its rhizome, its scales, and the shape of its fronds, which are of a leathery texture, and are suddenly narrowed at their base.—*Hooker*, *Synopsis Filicum*, p. 402.

A. (Gymnopteris) Linnæanum — Gym-nop′-ter-is ; Lin-næ-a′-num (Linnæus'), *Hooker*.

A stove species, native of the Malay Islands, of small dimensions and of purely botanical interest, with thin, paper-like barren fronds, usually proliferous at their extremity, and seldom measuring more than 9in. long, including their short stalks.—*Hooker*, *Synopsis Filicum*, p. 417.

A. (Elaphoglossum) luridum—El-aph-og-lōs′-sum ; lu′-rid-um (lurid), *Fée*.

This stove species, native of Trinidad and Guiana, of little decorative value, is somewhat in the way of *A. latifolium* (la-tif-ol′-ĭ-um), from which, however, it differs by its more spoon-shaped fronds, which are also more blunt and slightly scaly at the edge; they seldom exceed 1ft. in length, and are of a very coriaceous (leathery) texture, with both sides naked.—*Hooker, Synopsis Filicum*, p. 402.

A. (Elaphoglossum) magnum—El-aph-og-lōs′-sum; mag′-num (large), *Baker* (?).

This very handsome stove species, native of British Guiana, is a very decorative Fern, although its fronds are entire (undivided). The barren ones, from 2ft. to 3ft. long and from 1½in. to 2in. wide, are lanceolate (spear-shaped), being gradually narrowed to both ends; they are of a coriaceous (leathery) texture and light colour, their upper surface being covered with minute, whitish, chaffy scales, while on the under-surface these are of a ferruginous (rusty) colour, and very dense. These fronds are borne on tufted stalks 3in. to 4in. long, which proceed from a sub-erect (nearly upright) rhizome or stem; this is also densely clothed with small paleæ (chaffy scales) of a nearly black colour.—*Nicholson, Dictionary of Gardening*, iv., p. 484.

A. Mandoni—Man′-don-ĭ (Mandon's), *Mettenius.*

A botanical species of most diminutive size, native of the Andes of Bolivia. Its barren fronds, barely 2in. long, have both sides densely covered with reddish-brown scales.—*Hooker, Synopsis Filicum*, p. 522.

A. marginale—mar-gin-a′-lĕ (marginal), *Baker.*

This stove species, of small dimensions, native of the Andes of Ecuador, has barren fronds of a remarkably leathery texture, and naked on both surfaces; they are oblong-lanceolate (elliptically spear-shaped), about 6in. long by 2in. broad, narrowed suddenly at the base and gradually to their point, and bordered by a dense fringe of minute, spreading, brown scales. The stipes (stalks) on which the barren fronds are borne are only 3in. to 4in. long, and, like the woody rhizome (prostrate stem) from which they proceed, are thinly covered with linear (much longer than wide) scales of a light brown colour. The fertile fronds, which are ornamented with a similar border, are of a different shape, being ligulate (strap-like), about ½in. broad; their upper surface is clothed with scales, adpressed (closely pressed together), and the stalks on which they are borne reach fully 1ft. in length.—*Hooker*, *Synopsis Filicum*, p. 519.

A. (Elaphoglossum) Matthewsii—El-aph-og-lōs′-sum ; Mat-thews′-ĭ-i (Matthews'), *Fée.*

A stove, Mexican and Peruvian species, of botanical interest only, with barren fronds seldom exceeding 3in. in length, and borne on stalks of the same length. Contrary to nearly all other Acrostichums (Ac-ros′-tich-ums), this has fertile fronds larger than the barren ones, and also borne on longer stalks.—*Hooker*, *Synopsis Filicum*, p. 408.

A. (Elaphoglossum) melanopus—El-aph-og-lōs′-sum ; mel-an′-op-us (having a black foot), *Kunze.*

This stove Fern, native of Venezuela, is of comparatively small dimensions, its barren fronds being from 5in. to 8in. in length and about 2in. broad. They are of an elliptical-oblong shape, and sharply pointed at their extremity, while their base is rounded; they are of a coriaceous (leathery) texture, and have their margins ornamented with small, dark scales. The stipes (stalks) on which they are borne are 2in. to 3in. long, and, as well as the short-creeping rhizome (prostrate stem) from which these are produced, are densely covered with long, blackish or dark chestnut-coloured scales. The fertile fronds, borne on longer stalks, are only half the size, shorter and narrower. —*Hooker*, *Synopsis Filicum*, p. 403. *Lowe*, *Ferns British and Exotic*, vii., t. 59.

A. Mettenii—Met-ten′-ĭ-i (Mettenius'), *Kuhn.*

A stove species, of small dimensions and of purely botanical interest, native of the valley of Lloa, Ecuador, where it is found growing wild on trees in company with *A. dendricolum* (den-dric′-ol-um). Its barren fronds, of a thin but firm texture, seldom exceed 8in. in length, including the stalks on which they are borne.—*Hooker*, *Synopsis Filicum*, p. 520.

A. (Elaphoglossum) micradenium—El-aph-og-lōs′-um ; mi-cra-den′-ĭ-um (small-glanded), *Fée.*

This dwarf-growing, stove species, native of the Sandwich Islands, is of little decorative value, for its barren fronds, of an herbaceous or soft texture, seldom measure more than 8in. in length, including their stalks, which are covered with small, linear (much longer than broad) scales of a dark chestnut-brown colour.—*Hooker*, *Synopsis Filicum*, p. 400.

A. (Chrysodium) minus—Chry-so′-dĭ-um ; min′-us (small), *Mettenius.*

A stove species, of small dimensions, and of botanical interest only, with fronds barely 4in. long, including their stalks. It is a native of the Philippines, but has been also gathered by Hooker and Dr. Thomson on the Khasya Hills, at an elevation of 2000ft. to 3000ft.—*Hooker*, *Synopsis Filicum*, p. 420.

A. Mulleri—Mul′-ler-i (Muller's), *Fournier.*

A greenhouse, Mexican species, of small dimensions and of little decorative value, but very peculiar through its spear-shaped fronds, only 4in. to 6in. long, having both surfaces densely clothed with reddish, stellate (star-shaped) scales.—*Hooker*, *Synopsis Filicum*, p. 522.

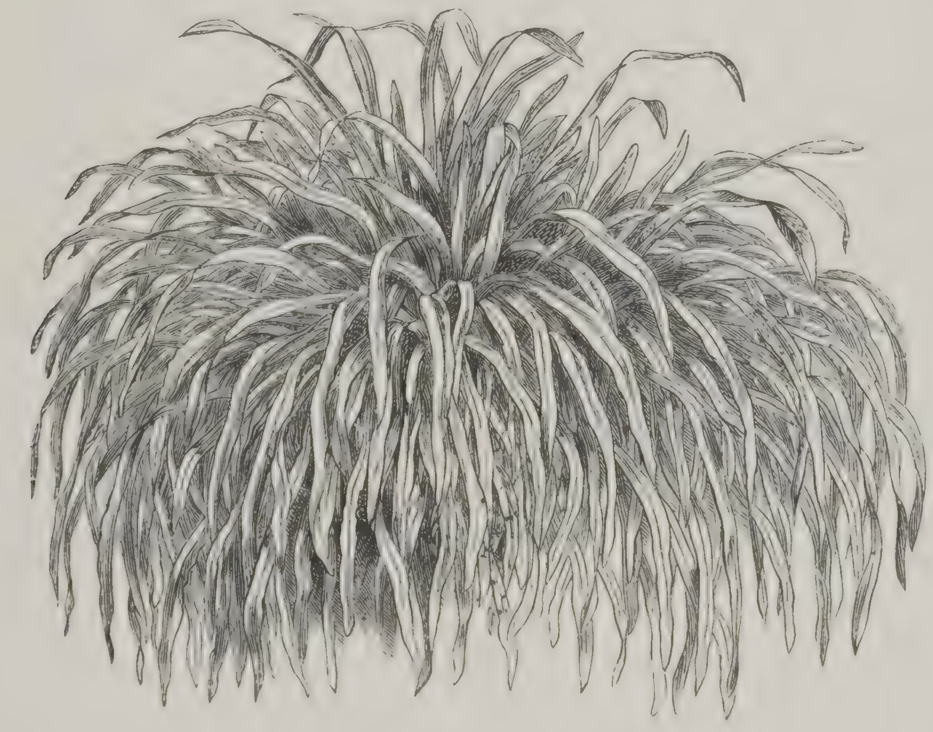


Fig. 28. Acrostichum muscosum

($\frac{1}{12}$ nat. size).

A. muscosum—mus-co′-sum (mossy), *Swartz.*

In this very distinct, stove species, which is a native of tropical America, from Mexico and the West Indies to Peru and Brazil, the barren fronds, 8in. to 12in. long and about 1½in. broad, are narrowed at both ends; they are of a coriaceous (leathery) texture, and their upper surface is naked, while their lower surface is quite hidden by imbricated or overlapping scales, shortly ciliated (fringed with hairs), of a rusty colour, and frequently dark chestnut-brown in the middle; they are borne on firm stipes (stalks), 4in. to 6in. long, clothed with large, ovate (egg-shaped), pale brown scales, and are produced from a woody, short rhizome (prostrate stem), equally covered with scales of a bright chestnut-brown colour. The fertile fronds are much smaller than the barren ones, but their stalks are longer. See Fig. 28.—*Hooker*, *Species Filicum*, v., p. 231. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. (Gymnopteris) nicotianæfolium—Gym-nop′-ter-is; ni-co-tĭ-a-næ-fol′-ĭ-um (Tobacco-leaved), *Swartz.*

This stove species, native of Cuba, is of very easy culture and highly decorative. Its barren fronds, which are from 1ft. to 3ft. in length, frequently measure 1ft. in breadth, and are usually composed of a large, terminal pinna (leaflet) and two or three pairs of lateral pinnæ 6in to 12in. long and sometimes 3in. broad, of a papyraceous (paper-like) texture, shining, and with both surfaces naked; these barren fronds are borne on stipes (stalks) 1½ft. to 2ft. long, scaly below, and are produced from a woody, wide-creeping or long-trailing, scaly rhizome (prostrate stem). The fertile pinnæ (fruiting leaflets) are distant (set far apart), 3in. to 4in. long and about 1in. broad, the basal ones petiolate (borne on stalks), the upper ones adnate (closely attached to the stalk).—*Hooker*, *Species Filicum*, v., p. 275. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., t. 50.

A. nigrescens—nig-res′-cens (nearly black), *Hooker.*

A stove species of purely botanical interest, native of British Guiana.—*Hooker*, *Synopsis Filicum*, p. 400.

A. Norrisii—Nor-ris′-ĭ-i (Sir W. Norris'), *Hooker.*

This stove species, from Penang, resembles *A. flaccidum* (flac′-cid-um) in the shape of its barren fronds, but their texture is that of *A. conforme* (con-for′-mĕ) and *A. latifolium* (la-tif-ol′-ĭ-um). They are sessile (stalkless) or nearly so, and leathery; they measure from 1ft. to 1½ft. in length and about 1in. in breadth, and are produced from a stout, woody rhizome (prostrate stem), covered with linear (very long and narrow) scales of a dull brown colour. The fertile fronds are much narrower than the others.—*Hooker, Species Filicum*, v., p. 215.

A. obductum—ob-duc′-tum (concealed), *Kaulfuss.*

A stove species, native of the Mauritius and Bourbon Islands, resembling in texture and habit some of the large forms of *A. viscosum* (vis-co′-sum). Its barren fronds, 1ft. to 1¼ft. long and more than 1in. broad, have their base gradually narrowed, and are of a sub-coriaceous (somewhat leathery) texture; their upper surface is naked; the small, pale-coloured scales with which their under-surface is densely covered are altogether peltate (attached by the middle) and very minute, and the coating, though close, is very thin and easily rubs away. These fronds are borne on firm, erect stipes (stalks), 3in. to 4in. long, which, like the woody rhizome (prostrate stem) from which they spring, are densely covered with small, linear (long and very narrow) scales, with a black centre and a grey edge. The fertile fronds are much smaller than the others.—*Hooker, Species Filicum*, v., p. 237.

A. (Gymnopteris) oligarchicum—Gym-nop′-ter-is; ol-ig-arch′-ic-um (commanding), *Baker.*

A stove species from North Peru, of little decorative value, with barren fronds pinnate (divided to the midrib), 8in. to 12in. long and 3in. to 6in. broad, and of a soft texture, and fertile fronds simple (undivided), 3in. to 4in. long, borne on stipes (stalks) 6in. to 12in. long.—*Hooker, Synopsis Filicum*, p. 418.

A. ornatum—or-na′-tum (adorned), *Mettenius.*

A stove species, native of the Andes of Venezuela, of botanical interest, but rendered generally interesting through the edge of the fronds, which are 6in. to 7in. long, and narrowed at both ends, being densely fringed with very minute, rust-coloured scales; and also through the stalks on which they are borne being, like the midrib beneath, densely clothed with spreading, pale reddish scales 2in. to 3in. long.—*Hooker, Synopsis Filicum*, p. 522.

A. (Polybotrya) osmundaceum—Pol-yb-ot′-ry̆-a; os-mun-da′-cĕ-um (Osmunda-like), *Hooker.*

This evergreen, stove species, native of Ecuador and South Brazil, may justly be considered as the handsomest of all the Acrostichums (Ac-ros′-tich-ums) of scandent habit, climbing as it does, in St. Catharine Island, more than 20ft. up the trunks of trees, of which it eventually takes entire possession. The barren and the fertile fronds in this beautiful species are entirely different, though both are produced in abundance from a dark, scaly, stout, creeping rhizome (prostrate stem) of a woody nature. The barren ones are ample, tripinnate (three times divided to the midrib), and their lower pinnæ (leaflets), 1½ft. to 2ft. long and 6in. to 8in. broad, are of a leathery

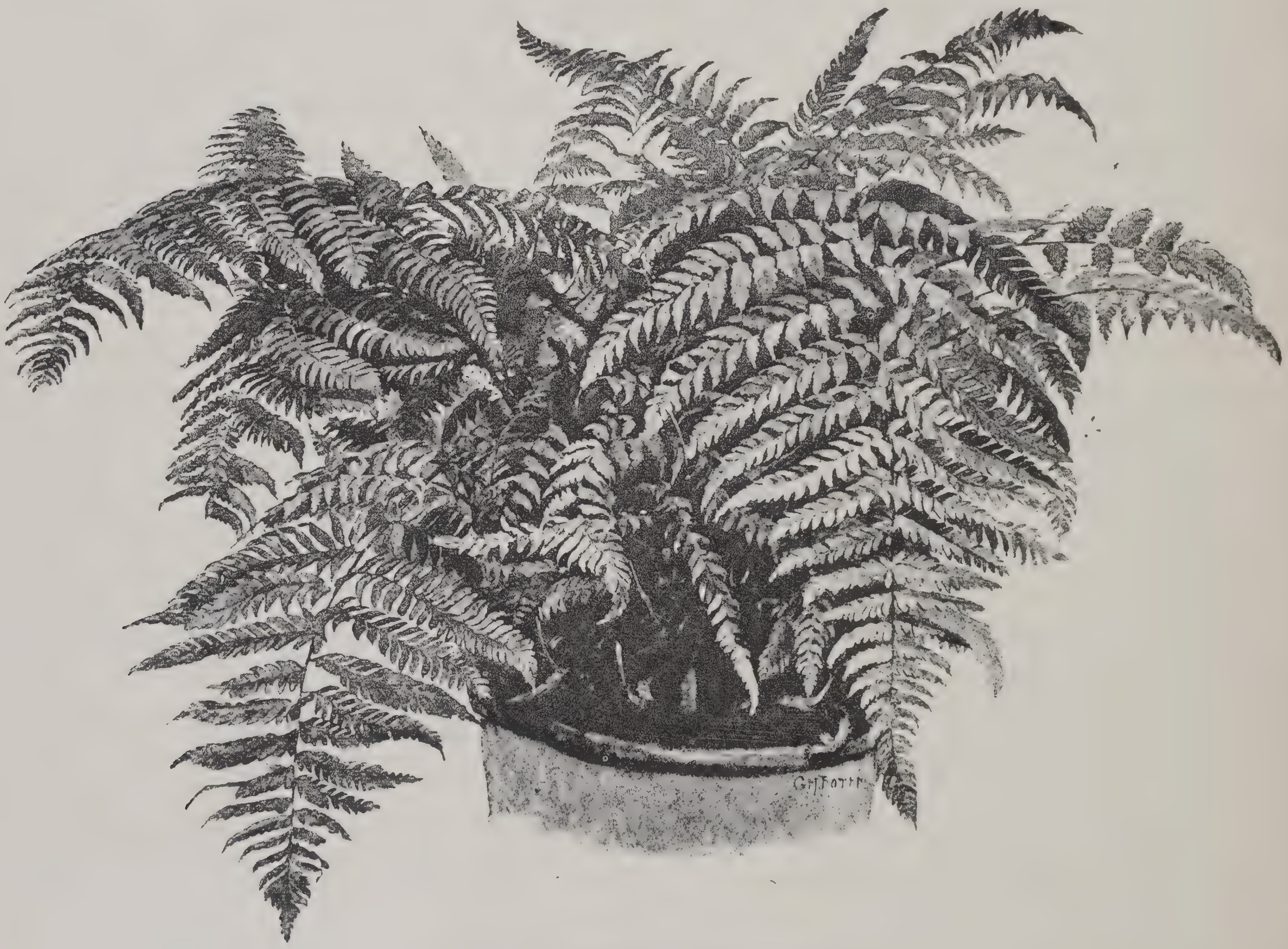


Fig. 29. Acrostichum osmundaceum.
($\frac{1}{12}$ nat. size).

texture, with both sides naked. The barren pinnules (leafits) are stalked, lanceolate (spear-shaped), and cut down nearly or quite to the rachis (stalk) below into close, nearly entire lobes; they are quite smooth, of a dark green colour, and have much the appearance of an Aspidium (As-pid′-ĭ-um) or of Polystichum aculeatum (Pol-ys′-tich-um ac-u-lĕ-a′-tum). The fertile fronds, also tripinnate, are of dimensions nearly equal to those of the barren ones, and erect in habit; but the pinnæ are contracted, and their segments are linear (much longer than wide), cylindrical, ¼in. to ½in. long, with a space between them, and wholly covered with sori (clusters of spore-cases). See Fig. 29.—*Hooker*, *Species Filicum*, v., p. 246. *Nicholson*, *Dictionary of Gardening*, i., p. 19. *Lowe*, *Ferns British and Exotic*, vii., t. 151.

A. ovatum—o-va′-tum (egg-shaped), *Hooker*.

A very dwarf, stove, Brazilian species, of purely botanical interest, readily distinguished from the small forms of *A. spathulatum* (spath-ul-a′-tum) by its wide-creeping or long-trailing rhizome (prostrate stem), covered with bright brown scales of a peculiar fibrillose (thread-like) nature.—*Hooker*, *Synopsis Filicum*, p. 408.

A. (Chrysodium) pachyphyllum—Chry-so′-dĭ-um; pach-yph-yl′-lum (thick-leaved), *Kunze*.

Although possessing but little decorative value, the barren fronds of this stove, Peruvian species, which has quite the habit and the very coriaceous (leathery) texture of an Elaphoglossum (El-aph-og-lŏs′-sum), attain fully 2ft. in length and 6in. in breadth, and are borne on strong, erect stalks nearly 1ft. in length.—*Hooker*, *Synopsis Filicum*, p. 421.

A. palustre—pal-us′-trĕ (marshy), *Hooker*.

A stove species, of botanical interest only, native of the Guinea Coast. —*Hooker*, *Synopsis Filicum*, p. 402.

A. (Chrysodium) pandurifolium—Chry-so′-dĭ-um; pan-du-rif-ol′-ĭ-um (with fiddle-shaped fronds), *Hooker*.

A curious, small-growing, stove species, of botanical interest, native of the Andes of Peru.—*Hooker*, *Synopsis Filicum*, p. 422.

A. Patini—Pat-i′-ni (Patin's), *Baker.*

This stove species, of medium growth, but of little decorative value, was discovered by Patin in the Andes of New Granada.—*Hooker, Synopsis Filicum,* p. 519.

A. (**Rhipidopteris**) **peltatum**—Rhi-pid-op′-ter-is ; pel-ta′-tum (peltate-fronded), *Swartz.*

This exceedingly pretty, dwarf-growing, stove species, whose habitat extends from Mexico and the West Indies to Peru and Brazil, where it is found growing luxuriantly in decayed vegetable matter and on trunks of trees, is one of the most distinct, as also one of the most attractive, of all the numerous species belonging to the genus. As the name *peltatum* implies, and as may be seen by Fig. 30, its little barren fronds, of a coriaceous (leathery) texture, from 1½in. to 2in. each way, are attached by their centre, or nearly so, to slender stalks 2in. to 4in. long and scaly throughout. These barren fronds, which are produced in great abundance, are essentially different from those of any other member of the genus, as they are repeatedly dichotomous—that is to say, not only is each portion of them forked, but each forked part is subdivided into two branches, and each of these again into two

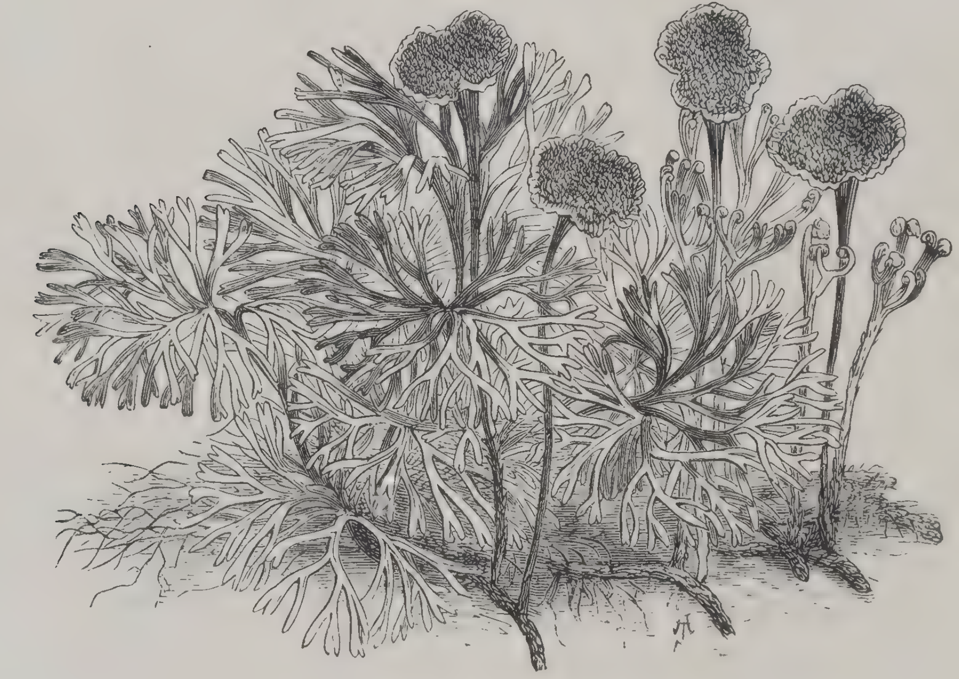
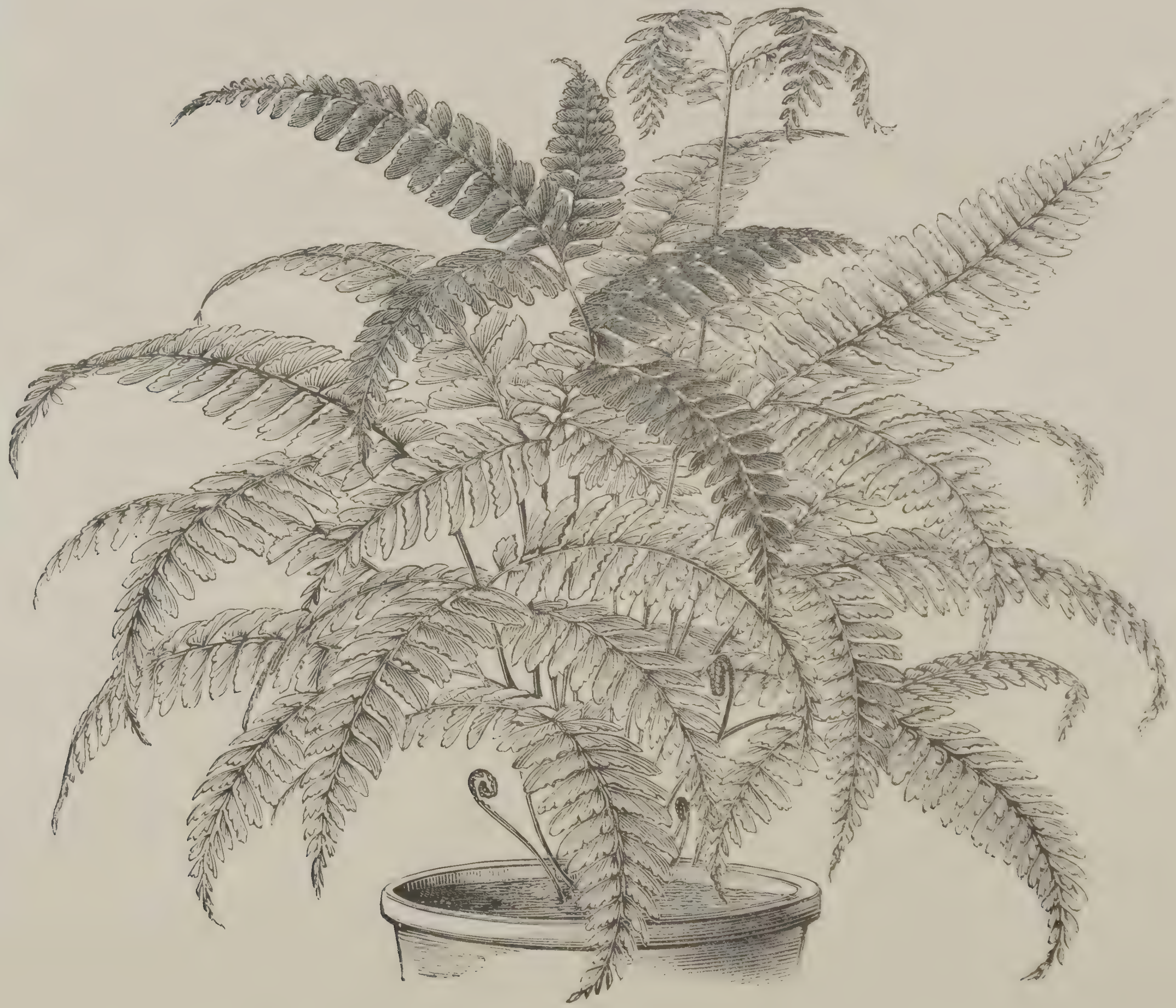


Fig. 30. Acrostichum peltatum
(½ nat. size).



Adiantum tetraphyllum gracile

(⅕ nat. size).

others, thus producing an agglomeration of divisions linear in form, or of about equal width throughout their length, and seldom more than half a line broad. The fertile fronds, which are totally distinct, sub-orbicular (nearly circular), generally entire (uncut), and barely 1in. broad, though occasionally two-lobed, are borne much more sparingly on the same slender rhizome (prostrate stem) that produces the barren ones. See Fig. 30.—*Hooker*, *Species Filicum*, v., p. 252. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

Unless kept in a place naturally moist, this elegant little Fern, which does not bear having its roots disturbed more than is necessary, and which, furthermore, requires a liberal supply of water *all the year round*, is considered a somewhat shy grower. When, however, in a place in which a permanently moist atmosphere may be depended upon, it grows freely in a mixture, in about equal proportions, of partly-decayed leaf-mould, fibrous peat, and silver sand.

A. p. gracillimum—grac-il′-lim-um (most graceful), *Moore.*

A Brazilian variety, partaking of the same habit as the species, and with fronds of the same peculiar shape and conformation, but of larger dimensions and much more finely divided. It is also of easier cultivation, and thrives under the treatment recommended for *A. peltatum.*

A. perelegans—per-e′-leg-ans (very elegant), *Fée.*

A small-growing, stove, evergreen species, of botanical interest, native of Brazil and Peru.—*Hooker*, *Synopsis Filicum*, p. 411.

A. petiolosum—pet-ĭ-ol-o′-sum (stalked), *Hooker.*

This very handsome and strong-growing, stove species, native of Mexico, the West Indies, Brazil, &c., is better known under the name of *Polybotrya caudata* (Pol-yb-ot′-rӯ-a cau-da′-ta), and is totally distinct from the diminutive and uninteresting *A. petiolosum* of Desvaux, which is a native of Ecuador and Peru, and which seldom reaches above 6in. in height. The barren fronds of the species to which we refer, instead of being entire (undivided), are bipinnate (twice divided to the midrib), and sometimes tripinnatifid (three times nearly divided to the midrib), and, instead of being only a few inches long, they frequently measure from 2ft. to 4ft. in length and from 1ft. to 3ft. in breadth. They are deltoid in shape (resembling the Greek letter Δ), of a coriaceous (leathery) texture, and their upper pinnæ (leaflets), lanceolate (spear-shaped) and pinnatifid (divided nearly to the midrib), are sometimes 1½ft. long and 6in. to 10in. broad; these are again subdivided, and their pinnules (leafits) are in the form of long, falcate (sickle-shaped) lobes, reaching half-way down to the midrib, and with both surfaces naked, the upper one being particularly glossy. The fertile pinnules, which measure 2in. to 3in. in length, are very narrow (not more than one line broad), dangling (hanging loosely), continuous or beaded (round and set close together), and disposed from ½in. to 1in. apart. These fronds are borne on robust stipes (stalks) of a woody nature, which are covered at their base with long and very narrow scales, and which proceed from a wide-scandent or long-trailing, woody rhizome (prostrate stem) often 1in. in thickness.—*Hooker*, *Species Filicum*, v., p. 244. *Nicholson*, *Dictionary of Gardening*, i., p. 19.

A. pilosum—pil-o′-sum (hairy), *Hooker.*

This Mexican, stove species, although principally of botanical interest, is easily distinguished from all others by the texture and the clothing of its barren fronds, which are interesting through their being flexuose (bending gently to and fro in opposite directions), and covered on both sides with small scales of a bright brown colour, each of them resembling a tuft of stellate (radiating star-like) hairs. These fronds, 6in. to 8in. long and nearly 1in. broad, are borne on zigzag and slightly scaly stipes (stalks), which proceed from a rhizome (prostrate stem) of a woody nature, and densely covered with large, spear-shaped scales of a pale brown colour.—*Hooker*, *Species Filicum*, v., p. 241.

A. (Hymenolepis) platyrhynchos—Hym-en-ol′-ep-is; plat-ў-rhyn′-chos (broad-beaked), *Hooker.*

A stove species, from the Philippines, which is of little decorative value, but is distinct from most other species through the sori (clusters of spore-cases) being disposed in a patch, sometimes 2in. long, at the apex or point of the frond.—*Hooker*, *Species Filicum*, v., p. 280. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Polybotrya) plumbicaule—Pol-yb-ot′-rȳ-a ; plum-bic-au′-lĕ (lead-grey-stalked), *Baker.*

This stove species, native of Tarapota, North Peru, has barren fronds 1½ft. to 2ft. long and nearly 1ft. broad, simply pinnate (divided once only to the midrib), with about twelve pinnæ (leaflets) on each side, below the terminal one; the lower pinnæ are sessile (stalkless), 5in. to 6in. long and 1in. broad, and of a leathery texture. These fronds are borne on firm, upright, glossy stipes (stalks), which in the case of the fertile ones are longer; and both are produced from a wide-scandent or long-trailing, scaly rhizome (prostrate stem) of a woody nature.—*Hooker, Synopsis Filicum,* p. 413.

A. (Chrysodium) polyphyllum — Chry-so′-dĭ-um ; pol-yph-yl′-lum (having many leaves), *Hooker.*

A stove, Fijian species, of large dimensions; its barren fronds are sometimes simply pinnate (cut once only to the midrib), but more usually are several feet in length, and furnished with pinnæ (leaflets) of a soft texture, 6in. to 12in. long and 2in. broad, which are also pinnate, their pinnules (leafits) being numerous on each side, about 1in. in length, sessile (stalkless), lanceolate (spear-shaped), and sharply toothed. These fronds, which are produced in profusion from a wide-scandent or long-trailing rhizome (prostrate stem) are borne on firm, naked stipes (stalks), 6in. to 12in. long, and jointed at the base.—*Hooker, Species Filicum,* v., p. 269.

A. (Chrysodium) præstantissimum—Chry-so′-dĭ-um ; præ-stan-tis′-sim-um (most excellent), *Bory.*

In this robust-growing, West Indian, stove species, the fronds are produced from an erect caudex (upright stem), and are borne on firm, naked stipes (stalks) 1ft. or more long. They are of a sub-coriaceous or leathery texture, varying from 2ft. to 4ft. in length and from 1ft. to 1½ft. in breadth, and are furnished on each side with numerous sessile (stalkless) barren pinnæ (leaflets), which are from 6in. to 10in. long and nearly 2in. broad, and whose extremity is acute (sharp-pointed), the edge entire, and the base rounded. The fertile pinnæ, 4in. to 8in. long and ¼in. to ½in. broad, are further apart than the barren ones.—*Hooker, Species Filicum,* v., p. 269.

A. (Gymnopteris) Preslianum — Gym-nop′-ter-is ; Presl-ĭ-a′-num (Presl's), *Hooker.*

A stove species, of medium dimensions and of botanical value only, native of the Philippine Islands, but which, however, is also figured in Beddome's "Ferns of British India," t. 69, where it is stated that "it was discovered growing in great abundance on rocks in the bed of a river at the foot of the Bhagamundal Ghat, just below Talle Cavery, and at the confines of Malabar, Coorg, and South Canara."—*Hooker, Species Filicum*, v., p. 265.

A. Prestoni—Pres-to′-ni (Preston's), *Baker.*

A stove species, from Rio de Janeiro, with simple (undivided) barren fronds, 1ft. to 1½ft. long and 2in. broad, lanceolate (spear-shaped), and bordered on their whole length with a dense, persistent fringe of minute, spear-shaped scales of a brown colour. The stipes (stalks), 6in. to 9in. long, on which they are borne, are equally covered with spreading, brown-black scales, and proceed from a thick, short-creeping rhizome (prostrate stem) of a woody nature. The fertile fronds, of much smaller dimensions, are borne on longer stalks.—*Hooker, Synopsis Filicum*, p. 519.

A. (Polybotrya) pubens — Pol-yb-ot′-rў-a ; pu′-bens (pubescent or downy), *Baker.*

In this robust-growing, stove species, native of Brazil and Peru, the barren fronds, 2ft. to 3ft. long and 1ft. or more broad, are furnished with numerous pinnæ (leaflets), the lower ones of which are fully 6in. in length by 1½in. in breadth, and cut more than half-way down to the midrib into close, blunt lobes of a leathery texture. The fronds are borne on firm stalks, scaly below, 6in. to 9in. long, and produced from a scaly, woody rhizome (prostrate stem).—*Hooker, Synopsis Filicum*, p. 414.

A. (Gymnopteris) punctulatum — Gym-nop′-ter-is ; punc-tul-a′-tum (spotted), *Swartz.*

A stove species, of purely botanical interest and medium growth, native of the Mascarene Islands, Zambesi-land, &c., with fronds pinnate (divided to the midrib), the barren ones 1ft. to 1½ft. long and often 1ft. broad, borne on stalks 6in. to 12in. long.—*Hooker, Synopsis Filicum*, p. 419.

A. pygmæum—pyg-mæ′-um (small), *Mettenius.*

This stove species, of very dwarf habit, is of little decorative value. It is a native of the Andes of Columbia and Ecuador.—*Hooker, Synopsis Filicum*, p. 520.

A. (**Gymnopteris**) **quercifolium** — Gym-nop′-ter-is ; quer-cif-ol′-ĭ-um (Oak-leaved), *Retzius.*

This is a very uncommon, stove species, of small dimensions, native of Ceylon and South China ; its barren fronds, borne on stipes (stalks) about 2in. long, are Oak-leaf-shaped, little more than 1in. broad, and covered with short, brownish hairs. The fertile fronds, which are nearly twice the length of the barren ones and very much contracted, are halbert-shaped, erect, and borne on lengthy footstalks.—*Hooker, Species Filicum*, p. 279. *Nicholson, Dictionary of Gardening*, i., p. 20. *Lowe, Ferns British and Exotic*, vii., t. 49.

A. (**Chrysodium**) **Raddianum**—Chry-so′-dĭ-um ; Rad-dĭ-a′-num (Raddi's), *Kunze.*

This stove species, native of Brazil and Guiana, better known perhaps under the name of *Polypodium guianense* (Pol-yp-od′-ĭ-um gui-a-non′-sĕ), of Aublet, is very decorative, for its barren fronds, sometimes 2ft. in length and 1¼ft. in breadth, and borne on naked, firm stipes (stalks), are furnished on each side with numerous pinnæ (leaflets), which are 6in. to 8in. long, and have their edge toothed. The fertile fronds are like the others, but much smaller.—*Hooker, Species Filicum*, v., p. 264.

A. rampans—ram′-pans (trailing), *Baker.*

A stove species, of small dimensions and of purely botanical interest, native of Cuba.—*Hooker, Synopsis Filicum*, p. 518.

A. (**Gymnopteris**) **repandum**—Gym-nop′-ter-is ; rep-an′-dum (spreading), *Blume.*

This robust-growing, stove species has a very wide range of habitats, as it is known to exist in a wild state in the Philippine, Malay, and Polynesian Islands, also in New Caledonia, Queensland, the Seychelles, &c. Its barren fronds, which are very decorative, are from 1½ft. to 2ft. long and 8in. to 12in.

broad, sometimes elongated and rooting. They are furnished on each side with numerous pinnæ (leaflets) of soft texture, the lower ones fully 6in. long by 1in. broad; the fertile pinnæ, which are stalked and bowed, measure 2in. to 3in. in length.—*Hooker*, *Species Filicum*, v., p. 259.

A. (Chrysodium) reticulatum—Chry-so′-dĭ-um; re-tic-ul-a′-tum (netted or veined), *Kaulfuss.*

A stove species, of botanical interest only and of small dimensions, native of the Sandwich Islands.—*Hooker*, *Synopsis Filicum*, p. 421.

A. (Photinopteris) rigidum — Pho-ti-nop′-ter-is; rig′-id-um (stiff), *Wallich.*

In this handsome, strong-growing, stove species, native of the Philippines, and, according to Beddome, also found in Singapore, Java, Labuan, Luzon, &c., the fronds, several feet long and often 1ft. broad, are sometimes barren throughout, but oftener they terminate in ten or a dozen very contracted fertile pinnæ (leaflets) 5in. to 12in. long, and covered with spore-cases on their whole length, except on their costa (midrib) and on their slightly revolute margin. These fronds are of a very leathery texture and glossy; the barren pinnæ are stalked, jointed at the base, and from 3in. to 6in. long by 2in. to 3in. broad, their extremity generally caudate (terminating in a tail) and curved upwards. The stipes (stalks on which the fronds are borne), though short, are firm, nearly as thick as a goose quill, and produced from a wide-scandent or long-trailing rhizome (prostrate stem) of a woody nature and covered with fringed scales of a brown colour.—*Hooker*, *Species Filicum*, v., p. 281. *Beddome*, *Ferns of British India*, t. 69.

A. (Chrysodium) rivulare—Chry-so′-dĭ-um; ri-vul-a′-rĕ (growing by the river-side), *Baker.*

A stove species, of small dimensions and of proliferous habit, but of very little decorative value, native of Viti.—*Hooker*, *Synopsis Filicum*, p. 524.

A. rufidulum—ru-fid′-ul-um (slightly reddish), *Willdenow.*

A stove species, of small growth and very scaly appearance, of purely botanical interest, native of Madagascar.—*Hooker*, *Synopsis Filicum*, p. 522.

A. (Chrysodium) salicinum—Chry-so′-dĭ-um ; sal-ic′-in-um (Willow-like), *Hooker*.

Although its fronds attain nearly 2ft. in length, including their stalks, this stove species, native of Sierra Leone, is of very little decorative value.—*Hooker*, *Synopsis Filicum*, p. 422.

A. samoense—sam-o-en′-sĕ (native of Samoa), *Baker*.

A dwarf-growing, stove species, native of the Polynesian Islands, and one which possesses only botanical interest, though particularly singular on account of its fronds being densely clothed on both surfaces with brownish hairs of a soft, bright silky nature.—*Hooker*, *Synopsis Filicum*, p. 407.

A. (Stenochlæna) scandens — Sten-och-læ′-na ; scan′-dens (climbing), *John Smith*.

This very handsome stove species, very valuable as a decorative Fern, is a native of South China, Ceylon, Fiji, and the Himalayas, and, according to Beddome, is also found wild in moist forests in the Anamallay Mountains, and, up to 4000ft. elevation, in the Sampagee Ghat (Coorg) and South Canara. Its fronds, which have a particularly elegant outline and drooping habit, are from 2ft. to 3ft. long, besides the firm, naked stipes (stalks), 4in. to 6in. long, on which they are borne ; they are 1ft. or more broad, and simply pinnate (divided only once to the midrib). The pinnæ (leaflets), which are of a very leathery texture, although sometimes slightly stalked and articulated, are usually sessile (stalkless) ; they generally measure from 6in. to 8in. long and from 1in. to 1½in. broad, and have their edge thickened and serrated (having the appearance of a saw). The fertile pinnæ, which are very seldom seen on plants under artificial cultivation, though from 8in. to 12in. long, are so contracted that they are seldom more than two lines broad. See Plates A and B (the first drawing, A, does *not* represent this plant, but another cultivated at Kew under the same name. Plate B represents the true plant).—*Hooker*, *Species Filicum*, v., p. 249. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Beddome*, *Ferns of Southern India*, t. 201.

The rhizome (prostrate stem) on which the fronds are produced is very long-trailing, and on that account this species is very useful for large Ferneries, the more so that, although generally considered as a stove Fern, it grows very well in the intermediate house, where the winter temperature occasionally falls below 50deg. Fahrenheit. It is a somewhat coarse feeder as well as a vigorous grower, and prefers a compost of an open nature made of fibrous loam, fibrous peat, partly-decayed leaf-mould, and silver sand, in equal parts, with abundance of water at the roots all the year round.

A. Schlimense—Schlim-en′-sĕ (Schlim's), *Fée.*

A stove species, of small dimensions and of little decorative value, somewhat resembling *A. flaccidum* in texture, though distinctly stalked. It was discovered in New Granada by Schlim, and later on by Spruce, in Ecuador.—*Hooker*, *Synopsis Filicum*, p. 402.

A. Schmitzii—Schmitz′-ĭ-i (Schmitz's), *Mettenius.*

A greenhouse species, of small dimensions and of purely botanical interest, native of Mexico.—*Hooker*, *Synopsis Filicum*, p. 523.

A. scolopendrifolium—scol-op-en-drif-ol′-ĭ-um (Scolopendrium-leaved), *Raddi.*

This stove, Brazilian species is one of the most decorative of all the cultivated forms with simple (undivided) fronds comprised in the genus, for its singular barren fronds, often more than 1ft. in length and from 2in. to 3in. in breadth, are produced in great abundance from a very short-creeping or short-trailing rhizome (prostrate stem), which is densely covered with long and very narrow scales of a dark chestnut-brown colour. These fronds, of a coriaceous (leathery) texture, are of a pale green colour, and their stipes (stalks), from 8in. to 12in. long, their rachis (midrib), and their margin are densely covered with long, cordate (heart-shaped) scales of a brown colour. Contrary to the barren fronds, which are of a pendulous habit, the fertile ones, much smaller and more sparingly produced, are erect in habit and articulated (jointed) near the base of the stalks. The general aspect of the plant is that of a gigantic Scolopendrium of woolly or downy appearance.—*Hooker*, *Species Filicum*, v., p. 211. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Lowe*, *Ferns British and Exotic*, vii., t. 45.

This plant does not like to be disturbed at the roots, and thrives best when pot-bound, provided the watering is done carefully.

A. (Chrysodium) semicordatum—Chry-so′-dĭ-um; se-mic-or-da′-tum (heart-shaped on one side only).

This greenhouse species, native of the Neilgherries and Ceylon, has a most peculiar appearance on account of its barren fronds, 8in. to 12in. long by 3in. to 4in. broad, and sometimes proliferous (bearing young plants) at their extremity, being entirely different in shape to all other kinds; the base of their upper side is cordate (heart-shaped), while the base of the lower side is truncate (terminating abruptly); the fertile pinnæ (leaflets), 1in. to 1½in. long, are seldom more than one line broad. The fronds are produced from a short-creeping rhizome (prostrate stem) of a woody nature. —*Hooker*, *Synopsis Filicum*, p. 422.

A. (Chrysodium) serratifolium—Chry-so′-dĭ-um; ser-ra-tif-ol′-ĭ-um (having fronds toothed like a saw), *Mertens.*

A stove species, of medium dimensions, native of Venezuela, Brazil, Peru, Mexico, &c. Its barren fronds, which are borne on stipes (stalks) 1ft. to 1½ft. long, are fully 2ft. in length and 8in. to 12in. in breadth, and are furnished on each side with numerous sessile (stalkless) pinnæ (leaflets), 4in. to 6in. long and 1in. or more broad, and of a leathery texture. They are produced from a short-creeping rhizome (prostrate stem) of a woody nature, and slightly scaly.—*Hooker*, *Species Filicum*, v., p. 263. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Chrysodium) serratum—Chry-so′-dĭ-um; ser-ra′-tum (toothed), *Baker.*

A stove species, of small dimensions and of purely botanical interest; a native of Tarapoto, East Peru.—*Hooker*, *Synopsis Filicum*, p. 524.

A. Sieberi—Sie′-ber-i (Sieber's), *Hooker and Greville.*

A stove species, which, although attaining medium dimensions, is of but little decorative value; a native of Mauritius and the Bourbon Islands.—*Hooker*, *Synopsis Filicum*, p. 403.

A. simplex—sim′-plex (undivided), *Swartz.*

This stove species, which is found wild from Cuba to Brazil, is characterised by its firm, leathery barren fronds, 8in. to 12in. long and about 1½in.

broad, which are very gradually narrowed to both ends. Contrary to most of the species with simple (undivided) fronds, those of this species are quite naked on both sides, and their margin is distinctly cartilaginous (of a gristly nature). These fronds, as well as the fertile ones, which, instead of being as usual contracted, are larger, proceed from a short-creeping rhizome (prostrate stem) of a woody nature, and covered with spear-shaped scales, somewhat large, and of a dark brown colour.—*Hooker*, *Species Filicum*, v., p. 205. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Stenochlæna) sorbifolium—Sten-och-læ′-na; sor-bif-ol′-ĭ-um (Service-leaved), *Linnæus.*

Although its fronds are seldom more than 1½ft. long, this species, which requires stove treatment all the year round, may safely be considered as the one of all known Acrostichums which attains the most gigantic proportions in a wild state. Its habitat extends over a vast area, for it is known to be plentiful in the West Indian Islands, Mauritius, Bourbon, Singapore, in Tropical America, in Peru and South Brazil, also in New Caledonia, in the Philippines and Fiji Islands, in Cochin China, on the Guinea Coast, &c. In all these localities its thick rhizome (prostrate stem), of a woody nature and sometimes prickly, is frequently seen clasping trees, like a cable, to the height of 35ft. or 40ft. The fronds of this remarkable Fern, although comparatively short, are from 6in. to 12in. broad and simply pinnate (divided only once to the midrib). The barren pinnæ (leaflets), which are disposed from three to twenty on each side, are of a coriaceous (leathery) texture, 4in. to 6in. long, about 1½in. broad, articulated (jointed) at their base, and more or less serrated (dented) on the margins. The fertile pinnæ, which are set 1in. to 2in. apart, are from 2in. to 4in. long and much contracted, being barely ¼in. broad.—*Hooker*, *Species Filicum*, v., p. 241. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Beddome*, *Ferns of British India*, t. 192.

Several kinds, previously considered as distinct species, are now admitted to be but simple varieties of *A. sorbifolium*, differing mostly in the number of pinnæ or leaflets, and corresponding to the genus *Lomariopsis* of Fée, which comprises, among the most interesting and best-known forms, such Ferns as *Lomariopsis cuspidata*, Fée, a variety with long-stalked leaflets tapering into a sharp, stiff point; *L. variabilis*, Fée, with lower leaflets deeply pinnatifid (cut nearly to the midrib), and having round, dented lobes; and *L. Smithii*, Fée, a very curious form, with fronds sessile (stalkless), tripinnatifid (three times divided nearly to the midrib), and furnished with numerous small pinnules (leafits), dichotomously forked (divided into two parts which are repeatedly divided).

A. spathulatum—spath-ul-a′-tum (spoon-shaped), *Bory*.

This is a dwarf-growing, stove species, native of various parts of Tropical America, South Africa, and also of Ceylon, where, according to Beddome, it is found growing at an elevation of 5000ft. to 6000ft. It is from a nearly erect stem, densely scaly, and furnished with numerous wiry roots, that the firm, upright, short stipes (stalks) are produced. These bear barren fronds, about 4in. long by ½in. broad, of a coriaceous (leathery) texture, and having both surfaces and margins densely covered with hair-like scales. The fertile fronds, smaller than the barren ones, are borne on longer stipes, also of a scaly nature. This interesting little species is more generally known under the name of *A. piloselloides* (pil-o-sel-lŏ-i′-dēs).—*Hooker*, *Species Filicum*, v., p. 227. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Beddome*, *Ferns of Southern India*, t. 213.

A. (Hymenolepis) spicatum—Hym-en-ol′-ep-is; spi-ca′-tum (spiked), *Linnæus*.

This species, of medium growth, though found in Ceylon, Madagascar, the Philippines, and the Society Islands, may be considered a greenhouse Fern, for it is also a native of the Himalayas, where it is found wild at an elevation of 6000ft. Its fronds, 10in. to 18in. long and about 1in. broad, are of a leathery texture, and while their lower part is narrowed very gradually, their upper, entire (undivided) part is contracted and fertile. They are borne on firm stems, barely 2in. long, and proceeding from a short-creeping rhizome (prostrate stem) of a woody nature.—*Hooker*, *Species Filicum*, v., p. 280. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. Sprucei—Spru′-cĕ-i (Spruce's), *Baker*.

A stove species, which, although attaining rather large dimensions, its barren fronds sometimes measuring 3ft. in length, including their stalks, is not possessed of much decorative value. It is a native of Mount Chimborazo.—*Hooker*, *Synopsis Filicum*, p. 411.

A. squamipes—squa′-mip-es (scaly-footed), *Hooker*.

A stove species, of small dimensions and of purely botanical interest. Its small fronds are of a very leathery texture, and are densely covered with spear-shaped scales of a peculiarly bright reddish-brown colour. A native of New Granada and Peru.—*Hooker*, *Synopsis Filicum*, p. 404.

A. squamosum—squa-mo′-sum (scaly), *Swartz*.

Although not attaining very large dimensions, this singular species, which thrives equally well under either stove or greenhouse treatment, and which is also known under the name of *A. paleaceum* (pal-ĕ-a′-cĕ-um), deserves a special notice. It is a native of Sumatra, Ceylon, and the Sandwich Islands, also of Madeira and the Azores; while, according to Beddome, it is abundant on trees on the Neilgherries, about Nediwattan, and on the Sisparah Ghat. The barren fronds, of a thick but not leathery texture, are from 8in. to 12in. long and about 1in. broad, simple (undivided), attenuated (gradually narrowed) at the base, and densely covered on both sides with reddish scales of a velvety nature, extending to the edge, which appears ciliated all round. These curious fronds are borne on dark, scaly stipes (stalks), which proceed from a prostrate stem of a woody nature and equally scaly.—*Hooker*, *Species Filicum*, v., p. 240. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Beddome*, *Ferns of Southern India*, t. 197. *Lowe*, *Ferns British and Exotic*, vii., t. 48.

A. squarrosum—squar-ro′-sum (scurfy), *Klotzsch*.

A stove species, of dwarf habit and of purely botanical interest; native of Columbia.—*Hooker*, *Synopsis Filicum*, p. 405.

A. stelligerum—stel-lig′-er-um (star-bearing), *Wallich*.

This stove species, native of the Neilgherries, is found, according to Beddome, in the Anamallay forests, growing on rocks in the bed of the Trocadero River at an elevation of 4000ft. Its barren fronds, which are borne on stipes (stalks) 3in. to 5in. long, are narrow, spear-shaped, pointed at their summit, but gradually attenuated (narrowed) at their base; they are from 6in. to 9in. long, barely 1in. broad, and are densely clothed on both sides with minute scales of a bright rusty colour. The fertile fronds are much contracted, and are borne on longer stalks.—*Hooker*, *Synopsis Filicum*, p. 521. *Beddome*, *Ferns of Southern India*, t. 196.

A. stenopteris—sten-op′-ter-is (narrowly winged), *Klotzsch.*

A stove species, of somewhat large dimensions (although its fronds, of a particularly soft texture, are nearly stalkless), but possessing little decorative value; native of Columbia and Venezuela.—*Hooker*, *Synopsis Filicum*, p. 402.

A. (Elaphoglossum) stigmatolepis—El-aph-og-lŏs′-sum; stig-mat-ol′-ep-is (scale-marked), *Fée.*

This greenhouse species, of medium dimensions, is a native of the Neilgherries and the Anamallay Mountains, where, according to Beddome, it is common in ravines at no great elevation, and grows indiscriminately on rocks and on trees. Its barren fronds, of quite a leathery texture, are lanceolate (spear-shaped), 8in. to 12in. long by about 1in. broad, borne on stalks 2in. long; their upper surface is naked, while over their lower one are thickly scattered very minute black dots simulating scales, which, in this species, are only found covering the stalks, and the stout, short-creeping rhizome (prostrate stem) from which they are produced. The much smaller fertile fronds are borne on longer stalks.—*Hooker*, *Synopsis Filicum*, p. 521. *Beddome*, *Ferns of Southern India*, t. 199.

A. stramineum—stra-min′-ĕ-um (straw-coloured), *Mettenius.*

A stove species, of small dimensions and of purely botanical interest; native of New Granada.—*Hooker*, *Synopsis Filicum*, p. 403.

A. strictum—stric′-tum (straight), *Raddi.*

This stove species, of small dimensions, although rendered very distinct by the presence of numerous ciliated (fringed) scales of a dark chestnut-brown colour on its short-creeping rhizome (prostrate stem), as well as on the upper surface of its fronds, is of little decorative value. It is a native of Brazil and Columbia.—*Hooker*, *Species Filicum*, v., p. 225.

A. (Aconiopteris) subdiaphanum—Ac-on-ĭ-op′-ter-is; sub-dĭ-aph′-an-um (semi-transparent), *Hooker and Greville.*

The barren fronds of this singular species, 6in. to 8in. long by about 1½in. broad, are simple (undivided), with both ends gradually narrowed, and their edge entire. They are borne on firm, upright, scaly stipes (stalks), which proceed from an upright caudex (stem) of a woody nature.—*Hooker*, *Species Filicum*, v., p. 256. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Gymnopteris) subrepandum—Gym-nop′-ter-is; sub-rep-an′-dum (slightly waved), *Hooker.*

This stove species, native of the Islands of Luzon and Penang, is very decorative, for its barren fronds, 2ft. long by 1ft. broad, are copiously pinnate (many times cut down to the midrib), and are furnished on each side with numerous pinnæ (leaflets) of a coriaceous (leathery) texture, which sometimes are 6in. to 9in. long and 2in. broad. The fertile fronds are like the others, but smaller.—*Hooker*, *Species Filicum*, v., p. 275. *Nicholson*, *Dictionary of Gardening*, i., p. 20. *Beddome*, *Ferns of British India*, t. 339.

A. succisæfolium—suc-ci′-sæ-fol′-ĭ-um (Succisa-leaved), *Thouars.*

A stove species, of small dimensions and of purely botanical interest; native of the Bourbon and Mauritius Islands.—*Hooker*, *Synopsis Filicum*, p. 408.

A. (Gymnopteris) taccæfolium—Gym-nop′-ter-is; tac-cæ-fol′-ĭ-um (Tacca-leaved), *Hooker.*

This stove species, native of the Philippines, has barren fronds sometimes entire (undivided), about 1ft. long and 2in. to 3in. broad; sometimes 2ft. or more in length and more than 1ft. in breadth, and copiously pinnate (many times cut down to the midrib). In this latter case they are furnished with lanceolate (spear-shaped) leaflets 6in. to 9in. long, about 1½in. broad, and of a soft, paper-like texture. These barren fronds are borne on stipes (stalks) 3in. to 4in. long and scaly downwards. The fertile fronds are sometimes undivided, and attain about 1ft. in length: in other instances they are cut down to the midrib, with forked pinnæ (leaflets) of a particularly soft texture. The rhizome (prostrate stem) from which these fronds proceed is of a woody nature and densely covered with long, narrow scales of a dark reddish-brown colour. There exists also a three-lobed form of this species commonly known as *A. trilobum* (tril′-ob-um).—*Hooker*, *Species Filicum*, v., p. 279. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. tahitense—ta-hi-ten′-sĕ (native of Tahiti), *Carruthers.*

A small-growing, stove species, of purely botanical interest, which, as its name indicates, is a native of Tahiti.—*Hooker*, *Synopsis Filicum*, p. 522.

A. Tatei—Ta′-tĕ-i (Tate's), *Baker.*

This stove species, native of Nicaragua, is easily distinguished from all others of similar habit through its filiform (thread-like) rhizome (prostrate stem), which is long-trailing, and thinly clothed with broad, spear-shaped scales of a peculiar brown colour. The barren fronds are gradually narrowed to both ends, about 8in. long, and borne on rough, straw-coloured stipes (stalks); the fertile ones are rather shorter and narrower, but are borne on stalks of same size.—*Hooker*, *Synopsis Filicum*, p. 518.

A. tectum—tec-tum (covered), *Willdenow.*

A distinct, if not very decorative, stove species, whose habitat extends from Mexico and the West Indies to South Brazil and Peru. It is distinguished by its long barren fronds, of a leathery texture, which are narrowed gradually to both ends, and the upper surface of which is nearly or quite naked, while their under-surface is clothed with small, thin scales, of a brown colour and darker in the centre.—*Hooker*, *Synopsis Filicum*, p. 410.

A. (Stenochlæna) tenuifolium — Sten-och-læ′-na; ten-ŭ-if-ol′-ĭ-um (narrow-leaved), *Baker.*

This stove species, native of the Mascarene Islands and Natal, is not only a very decorative Fern, but one which is also easily distinguished from all others by the conformation of its fertile fronds. These, instead of being simply pinnate (only once divided to the midrib) and contracted, are twice pinnate; the pinnæ are borne on somewhat long stalks, and furnished with numerous pinnules (sub-divisions) 2in. to 3in. long and 1in. to 1½in. broad, spreading from the rachis or stalk at right angles. The barren fronds are simply pinnate, 3ft. to 5ft. long and 1¼ft. to 1½ft. broad, and have on each side twenty to thirty pinnæ 6in. to 12in. long and about 1½in. broad, terminating into a sharp point, and with their edge thickened and toothed; they are of a coriaceous (leathery) texture, glossy on both sides, and are borne on firm, upright, naked stipes (stalks) 4in. to 6in. long, produced from a wide-scandent or long-trailing rhizome (prostrate stem) of a woody nature, and slightly scaly.—*Hooker*, *Species Filicum*, v., p. 250. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Elaphoglossum) tomentosum—El-aph-og-lōs′-sum; to-men-to′-sum (woolly), *Bory*.

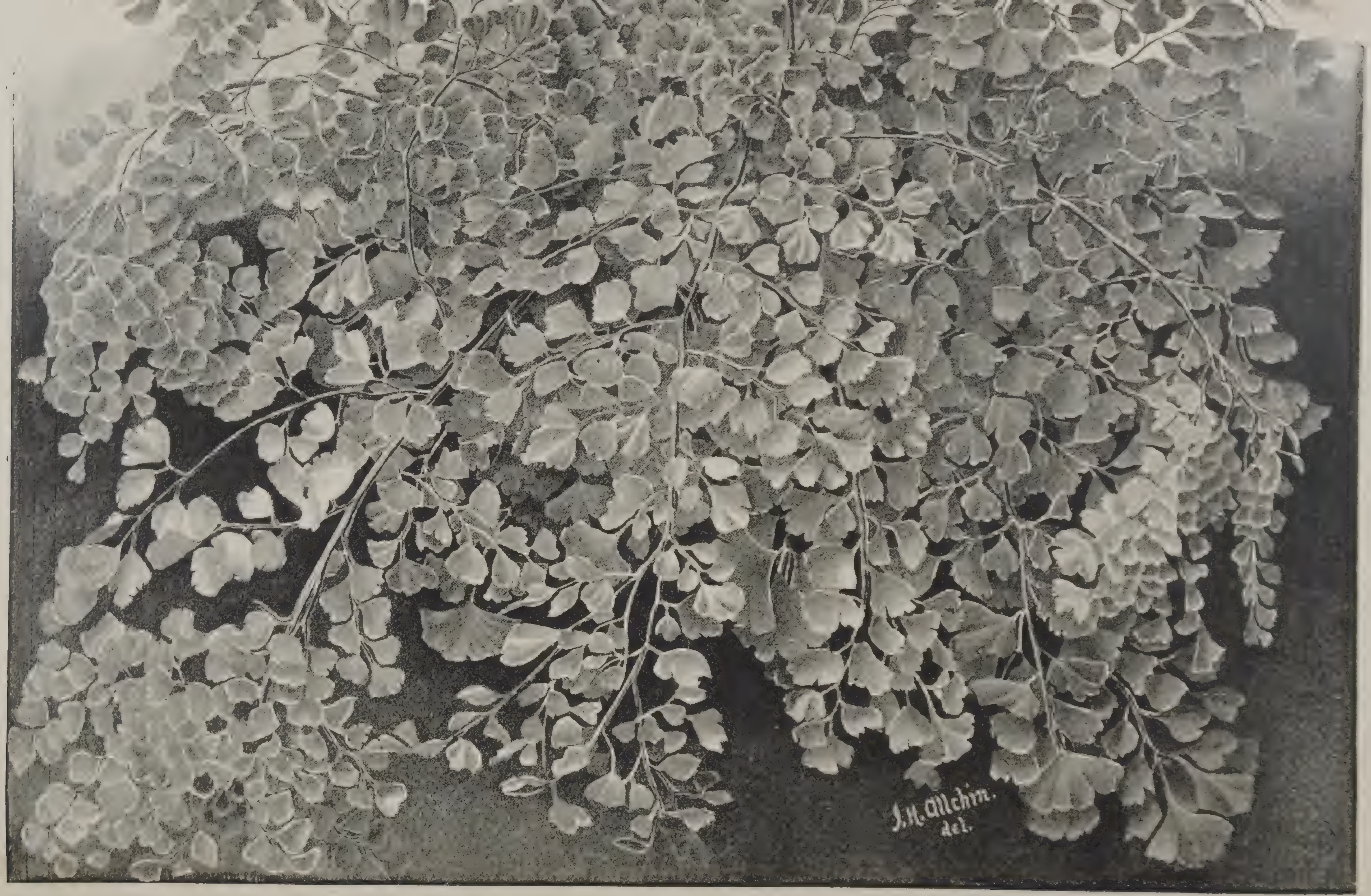
A stove species, native of the Bourbon Islands, somewhat resembling *A. Sieberi* in texture and general habit, but differing from it, as from many other kinds, in the peculiar nature of the scales with which its stalks and fronds are densely clothed: these scales are narrow, ending in short hairs, and the upper ones are quite white, while the lower ones are black in the middle.—*Hooker*, *Synopsis Filicum*, p. 411.

A. (Chrysodium) tricuspe—Chry-so′-dĭ-um; tric-us′-pĕ (having three points), *Hooker*.

This greenhouse species, native of Sikkim, is very singular. Its barren fronds, borne on firm, naked stipes (stalks) nearly 1ft. long, are formed of three entire or undivided lobes, the terminal one 6in. long and 2in. broad, the lateral ones rather smaller; they are of a coriaceous (leathery) texture, and naked on both surfaces. The fructification is generally confined to the upper half of the central lobe of the fertile fronds, which is 1in. to 3in. long and ¼in. broad; but it sometimes extends to the same portion of the lateral ones, which part is then contracted and soriferous (covered with spore-cases).—*Hooker*, *Species Filicum*, v., p. 272, t. 304.

A. (Gymnopteris) variabile—Gym-nop′-ter-is; var-ĭ-a′-bil-ĕ (variable), *Hooker*.

A stove species, of botanical interest only, native of the Himalayas (where it is found growing up to 3000ft. elevation), to Ceylon and Java.—*Hooker*, *Synopsis Filicum*, p. 417.



Adiantum cuneatum grandiceps
(⅓ nat. size).

A. villosum—vil-lo′-sum (clothed with long, weak hair), *Swartz.*

A pretty, dwarf, stove species, found in a wild state from Mexico to Cuba and Peru. The barren fronds, 6in. to 9in. long and 1in. to 1½in. broad, are simple (undivided), lanceolate (spear-shaped), undulated, and of a pale green colour: they are of a thin, flaccid texture, and have both their surfaces, as also their edge, more or less scaly. The fertile fronds, of similar shape, are of much smaller dimensions. Both kinds of fronds are articulated (jointed) near the base of the stipes (stalks), which are produced from a short rhizome (prostrate stem) of a woody nature, densely clothed with bright brown scales. This is a very variable species: among the principal deviations from the type may be named the thin-textured *A. Plumieri* of Fée, the small *A. setosum* of Liebmann, and the robust *A. undulatum* of Willdenow.—*Hooker, Species Filicum*, v., p. 225. *Nicholson, Dictionary of Gardening*, i., p. 20. *Lowe, Ferns British and Exotic*, vii., t. 54.

A. (Gymnopteris) virens—Gym-nop′-ter-is; vir′-ens (green), *Wallich.*

This stove species, of particularly robust constitution and decorative habit, is a native of Fernando Po, Sierra Leone: it is also found from the Himalayas to Ceylon, Formosa, and Moulmein. Its barren fronds, of a coriaceous (leathery) texture and with both surfaces naked, are from 2ft. to 3ft. long, often 1ft. broad, and furnished on each side with sessile (stalkless) pinnæ (leaflets) 6in. to 8in. long and about 1in. broad, the edge of which is usually bluntly lobed, though it sometimes has a tendency to become sinuate (uneven); the terminal pinna, twice as long as the lateral ones and frequently longer, is generally rooting at the point. These large fronds are borne on firm, upright stipes (stalks), which are devoid of scales, and which proceed from a short-creeping rhizome (prostrate stem) of a hard, woody nature. This handsome species appears to be connected with several equally decorative forms which are not possessed of characters sufficiently distinctive in themselves to be separated from it. Among these are *A. terminans* and *A. contaminans* of Wallich; *A. crispatulum*, equally of Wallich, with pinnæ (leaflets) narrow, crisped, and of a very leathery texture; *A. proliferum* of Hooker, with broad leaflets; *A. costatum* of Wallich, with pinnæ 8in. to 12in. long, 2in. to 3in. broad, and tinged with red.—*Hooker, Species Filicum*, v., p. 262.

A. (Elaphoglossum) viscosum — El-aph-og-lōs′-sum ; vis-co′-sum (clammy), *Swartz.*

This stove species, of easy cultivation and very distinct and ornamental, has a particularly wide range of habitat, for it is found wild from Cuba to Brazil and Peru, also on the Himalayas, whence its presence is noted to Ceylon, Java, and the Philippine Islands, besides having been gathered in the Seychelle and Mascarene Islands, Fernando Po, Angola, &c. It is very variable in size, as also in nature, according to the influence of the habitat in which it is found, and also to the age of the fronds : these are often quite naked, and then there is great difficulty in identifying the plant, whose foliage is usually furfuraceous (covered with scurfy scales), and often of a viscous nature (coated with a sticky, tenacious juice). There are some very large-growing forms, from which it is a matter of difficulty to clearly distinguish the typical species : among these are *A. curvans*, *A. dissimile*, *A. Karstenianum*, and *A. xanthoneuron* of Kunze. In the commonest form amongst subjects in cultivation, *A. viscosum* is of medium size. Its barren fronds are entire (undivided) and lanceolate (spear-shaped), pointed at their summit but gradually narrowed towards their lower part, from 8in. to 12in. long only, and about 1in. broad in their widest portion : these are of a coriaceous (leathery) texture, and both their surfaces are more or less covered with viscid (sticky) scales of very small dimensions. The stipes (stalks) on which the barren fronds are borne are from 3in. to 4in. long, firm, upright, and equally scaly ; while the rhizome (prostrate stem), from which they proceed, besides being densely covered with long and very fine scales of a dark chestnut-brown colour, shows very little inclination to creep as in most other species. The fertile fronds, though smaller, are borne on longer stems than the barren ones.—*Hooker*, *Species Filicum*, v., p. 220. *Nicholson*, *Dictionary of Gardening*, i., p. 20.

A. (Chrysodium) Wallii—Chry-so′-dĭ-um ; Wall′-ĭ-i (Wall's), *Baker.*

A stove species, of small dimensions and of purely botanical interest ; native of Ceylon. Its barren fronds, almost stalkless, of a thin but rigid texture, 8in. to 9in. long and less than ¼in. broad, are narrowed to both ends. The filiform (thread-like) fertile ones, 6in. to 8in. in length, are long-stalked.—*Hooker*, *Synopsis Filicum*, p. 523.

A. Welwitschii—Wel-wit′-schĭ-i (Welwitsch's), *Baker.*

Like the preceding one, this stove species, of equally small dimensions, is of very little decorative value; it is, however, rendered interesting by the minute, spear-shaped scales, of a peculiarly rusty colour, with which the under-side of its fronds and the stipes (stalks) bearing them are densely clothed. A native of Angola.—*Hooker*, *Synopsis Filicum*, p. 521.

A. (Polybotrya) Wilkesianum — Pol-yb-ot′-ry̆-a; Wilkes-ĭ-a′-num (Wilkes'), *Hooker.*

In this stove species, native of New Caledonia and the Society Islands, where its handsome fronds attain great dimensions, both the pinnæ (leaflets) and the pinnules (leafits) are distinctly jointed at the base. The fronds, which are borne on firm, upright, naked stipes (stalks) 6in. to 9in. long, frequently measure fully 2ft. in length and 1ft. in breadth. They are cut down to the rachis (midrib), where they are once more divided into numerous equal-sided pinnules of a peculiarly wedge-like form, especially at the base, with the rest of the edge deeply toothed. These fronds are of a coriaceous (leathery) texture and quite glossy; their fertile leaflets are linear and cylindrical (long, very narrow, and of a round form). The rhizome (prostrate stem), from which the fronds are produced, is long-trailing and naked, or deprived of scales.—*Hooker*, *Species Filicum*, v., p. 247.

A. Wrightii—Wright′-ĭ-i (Wright's), *Mettenius.*

A stove species, of dwarf habit and of purely botanical interest; native of Cuba.—*Hooker*, *Synopsis Filicum*, p. 401.

CHAPTER XIX.

ACTINIOPTERIS, *Link.*

(Ac-ti′-nĭ-op′-ter-is.)

Fan-Palm Fern.

THIS name is derived from *aktin*, a ray, and *Pteris*, a Fern, in allusion to the peculiar formation of the fronds, which radiate into numerous narrow segments or subdivisions, all of which start from a common central point. In Hooker and Baker's "Synopsis Filicum," *Actiniopteris* is given as Genus 40. It is composed of one solitary, but beautiful and distinct, species of Indian origin, and of one Australian variety of it only. Both plants are at once recognisable by their flabellate (fan-like) habit, resembling a perfect miniature Fan Palm, with fruit in character intermediate between *Asplenieæ* (As-ple′-nĭ-ĕ-æ) and *Pterideæ* (Pter-id′-ĕ-æ). The distinguishing character of *Actiniopteris* resides in the disposition of its sori (groups of spores), which are linear-elongated (very narrow and very long) and sub-marginal (disposed close to the margin of the fronds). The involucres or indusia, which are the cuticular or outside coverings of the sori, are of the same shape as the sori, folded over them, placed one on each side of the narrow subdivisions of which the frond is formed, opening towards the midrib.

Culture.

An idea of the tenacity of life with which these exceedingly pretty Ferns are endowed, may be gathered from the fact that we have repeatedly had opportunities of noting plants doing well and which had originally been sent from India, through the post, in a common letter or in an envelope, without any additional protection whatever. These plants are erroneously considered as very difficult to manage; consequently they are not grown as extensively as they really deserve, for they are most interesting and, though of comparatively small dimensions, are very decorative and attractive. Failure in their culture must, in many cases, be attributed to the excessive heat to which they are subjected, which causes them to get "thrippy" and lose their vitality; but, when kept in a temperature of 60deg. in the winter, raising to 70deg. in the summer, with constant moisture around them, they remain perfectly clean and healthy: they then seldom give any trouble to the cultivator, who is amply rewarded for whatever little extra attention he has bestowed upon these plants by the production of abundant and luxuriant foliage. The compost in which they thrive best consists of fibrous peat, fibrous loam, broken in small pieces, coarse silver sand, and small crocks, the whole in about equal proportions. It is also absolutely necessary that the pots in which these Ferns are grown should be half-filled with crocks, so as to insure perfect drainage, for they require frequent and abundant waterings to keep their roots in a permanently moist state all the year round.

Being devoid of rhizomes or stems of any kind, Actiniopteris are usually propagated from spores, which germinate very freely when sown on a compost of brickdust mixed with a little loam, and kept in a warm, close case. They may also be increased by the division of the crowns; but this operation, which should be done not later than the beginning of March, is of a somewhat risky nature, and requires a certain amount of experience and a good deal of attention to insure the establishing of the separated pieces.

A. radiata—rad-ĭ-a′-ta (rayed), *Link.*

This charming little palm-like Fern is found in a wild state throughout India, especially in the Peninsula, in Ava, Ceylon, Arabia, Upper Egypt, Abyssinia, the Mascarene Islands, Zambesi-land, Macalisberg, Angola, and all over the Madras Presidency, where, according to Beddome, it grows in exposed situations in dry, rocky places, from the sea-level up to 4000ft. elevation. It is of tufted habit, producing from a close, compact crown a quantity of fronds borne on stipes (stalks) 2in. to 6in. long, slender and naked. The leafy portion of the frond itself is fan-shaped, and seldom exceeds 1½in. each way; it is composed of numerous segments or sub-divisions, which are dichotomous (repeatedly divided in two), not more than half a line broad, and of a rush-like texture quite peculiar to this species. They are divided about half the distance down, of a bright green colour, and very glossy. The segments of the fertile fronds are longer than those of the barren ones, and these fronds are also borne on longer stalks. See Fig. 31 (reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author).—*Hooker, Synopsis Filicum*, p. 246. *Nicholson, Dictionary of Gardening*, i., p. 21. *Beddome, Ferns of Southern India*, t. 124.

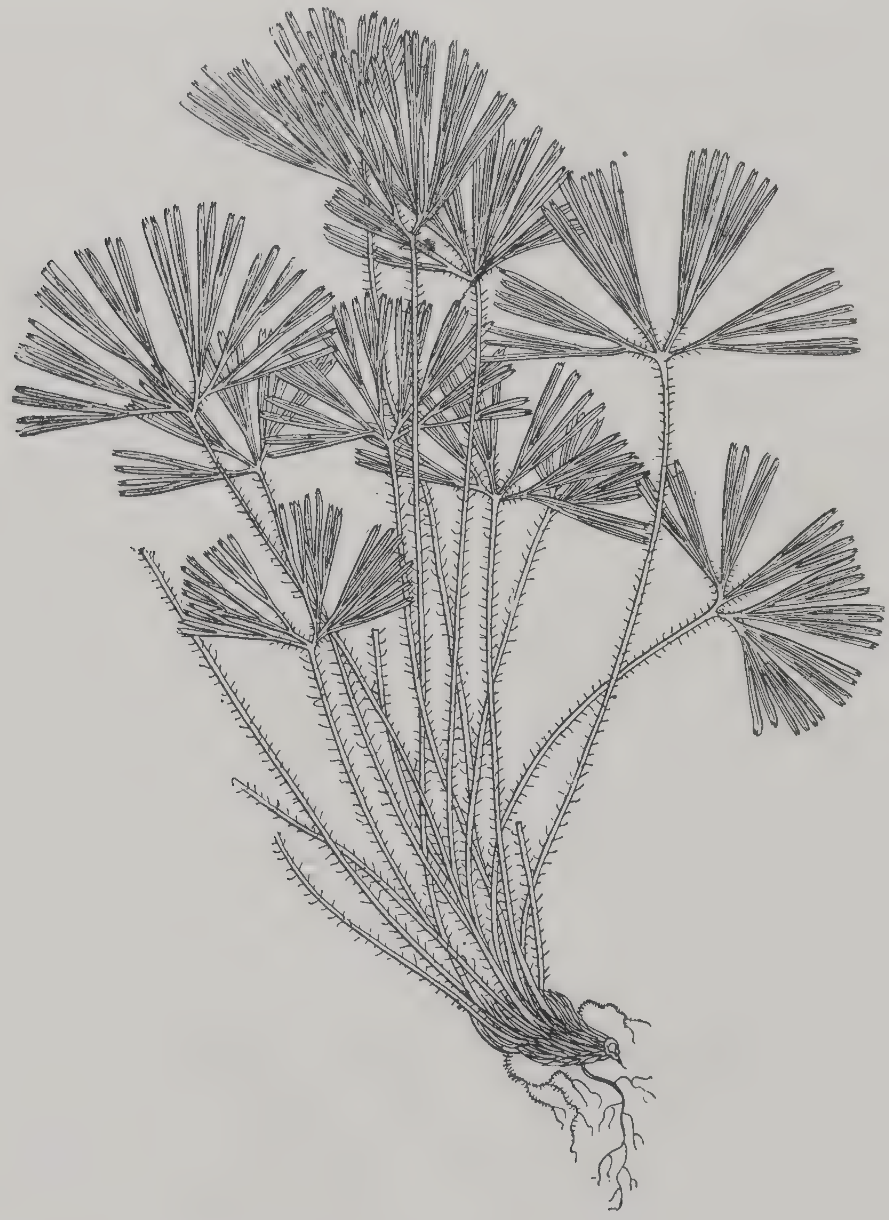


Fig. 31. Actiniopteris radiata
(⅔ nat. size).

A. r. australis—aus-tra′-lis (Southern), *Link.*

This much-admired form is in all respects a stronger and more vigorous grower than the species just described. The habit of the plant, though quite as compact, is not so stiff, the fronds frequently attaining a height of 8in. The segments are less numerous, much more deeply divided, larger, and, in fertile fronds, are subulate (awl-shaped) at the points; they are also of a darker green colour and very glossy. See Fig. 32.—*Hooker*, *Species Filicum*, iii., p. 276. *Nicholson*, *Dictionary of Gardening*, i., p. 21.

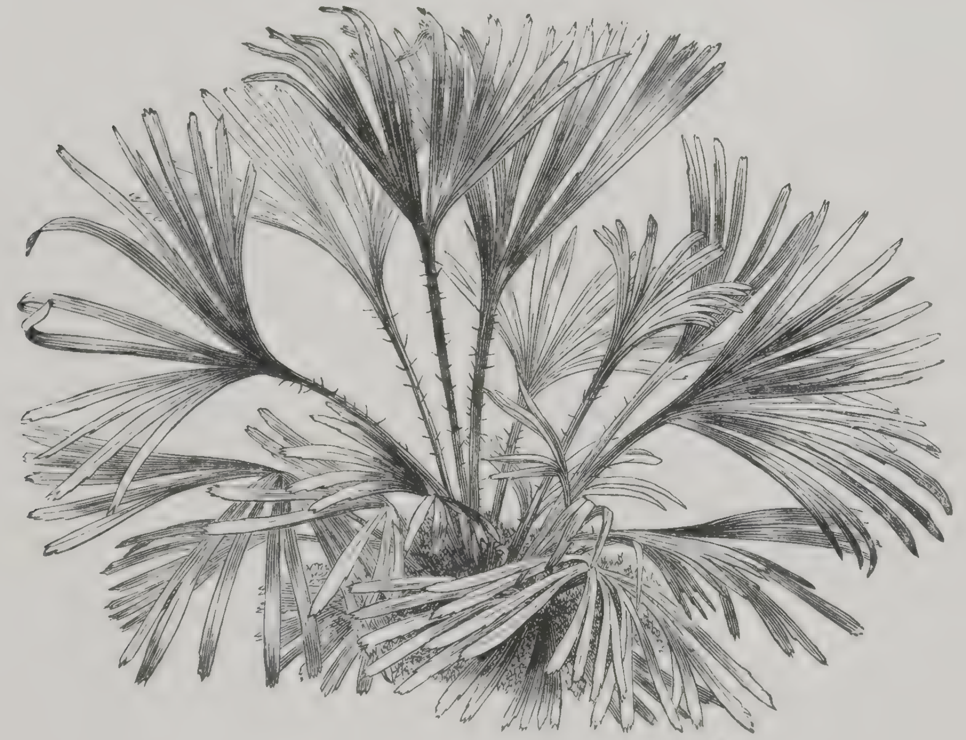


Fig. 32. Actiniopteris radiata australis
(½ nat. size).

This variety thrives in a temperature lower than that recommended for the species to which it is related.

* * *

ADIANTOPSIS (Ad-i-an-top′-sis). *See* **Cheilanthes.**

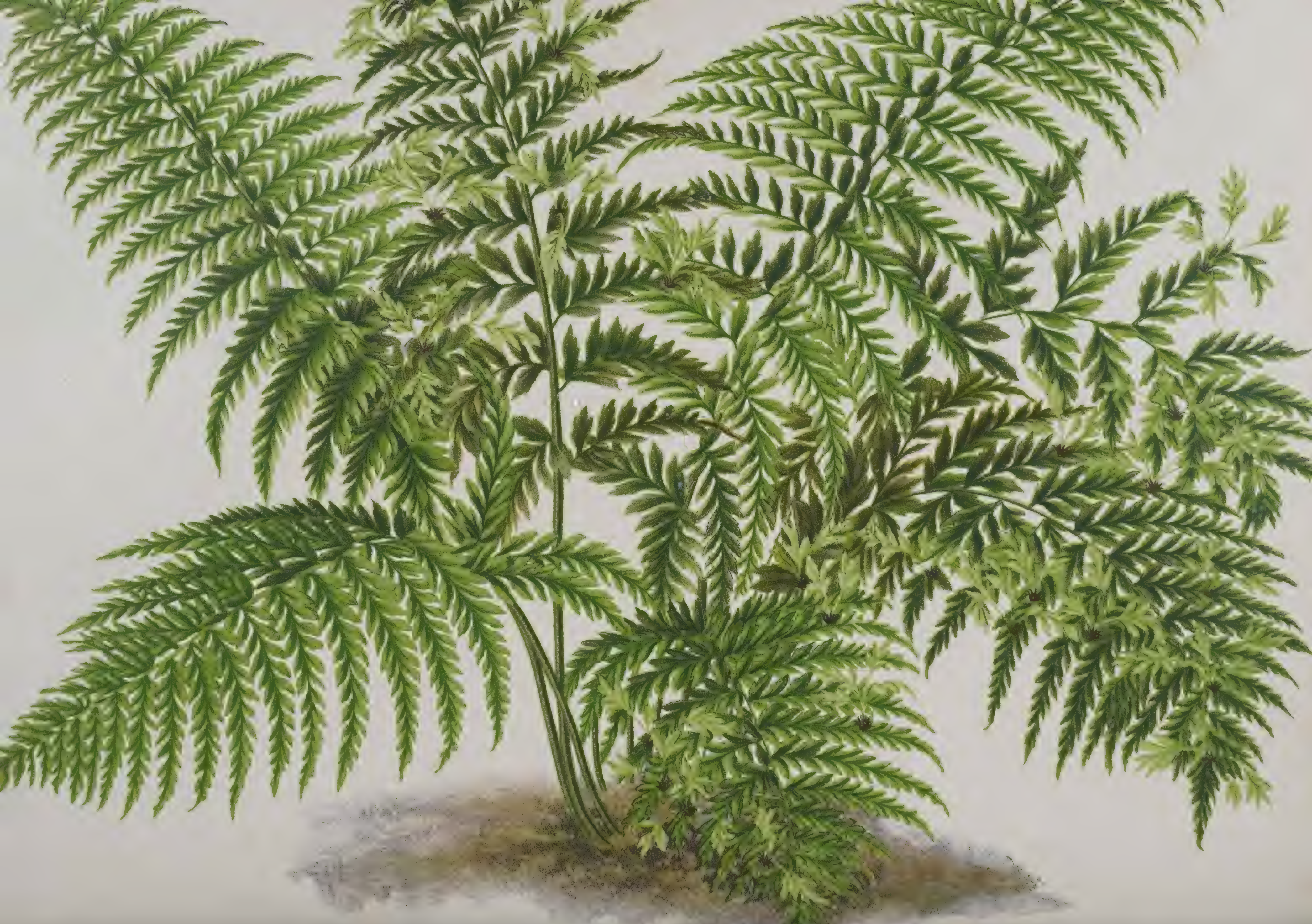
CHAPTER XX.

ADIANTUM, *Linnæus.*

(Ad-ĭ-an′-tum.)

Maidenhair.

THE name *Adiantum* is derived from *adiantos*, dry, and was given no doubt in allusion to the singular property possessed by most species belonging to this extensive genus, whose fronds have the power of repelling water developed to such an extent that, even after having been wholly submerged, they are, when taken out of the water, found to be as dry as before. In Hooker and Baker's "Synopsis Filicum," *Adiantum* forms Genus 21 : it is there said to have its head-quarters in Tropical America, although a good many species are natives of more temperate climates. Most of the known species are recognisable from all other Ferns but the typical Lindsayas by the texture, as also by the one-sidedness, of their segments (subdivisions), and by the absence of an apparent and distinct midrib in the segments. The stipes and rachis (stalks) of most Adiantums are black in colour, and have a glossy or polished appearance. Usually the pinnæ (leaflets) are either truncate (terminating abruptly), as though they had been shortened by the removal of their extremity, or wedge-shaped at the base, or dimidiate (fully developed on one side of the midrib and scarcely at all on the other), and soriferous (spore-bearing) only on the upper margin. The fronds are either simple (undivided), pinnate (once divided to the midrib), pedate (shaped like a bird's foot), bipinnate (twice divided to the midrib), reniform (kidney-shaped), or decompound



(several times subdivided); they are generally smooth and vary in length from 6in. to as many feet. Another distinctive character, almost peculiar to all members of the genus, is found in the nature of the veins of the pinnæ, for they are simple, radiating (all starting from a common point), and forked; but except casually in *A. lucidum*, *A. macrophyllum*, and perhaps some other species, they are anastomosing (running into one another) only in four known species, which are termed *Hewardia*, J. Smith. The *Capillus-Veneris* Group has flabellato-cuneate segments (sub-divisions fan-shaped or rounded at the top and wedge-shaped at the base); but even these leaflets are still without distinct midrib, whilst a few species have segments equilateral (equal on all sides), and in habit somewhat resemble species of *Pteris* and *Schizoloma*. In all Adiantums the sori (masses of spore cases) are disposed on the edge of the pinnæ, either in a continuous line or interrupted, and vary in shape, being sometimes kidney-shaped, elliptical, round, or even linear (much longer than broad): they are usually numerous and distinct, although there are exceptions. In all cases also the involucre, or indusium (outside covering), which is formed of a reflexed depression, is of the same shape as the sorus (heap of spore cases), which it covers, and varies in form according as the margin of the frond is more or less either dented or entire. This outside covering, which acts as a protection to the spores, after a time becomes replicate (doubled down), so that its upper part, which bears the capsules, comes in immediate contact with its lower part.

As regards the variety of forms, the genus may be considered very rich, for every one of the known Adiantums finds its place in one of the eight following groups, into which the whole genus is subdivided:

1.—A small group of species with simple (undivided) fronds, of which *A. reniforme* is the type.

2.—RADICANTES (Ra-di-can′-tes), or "Rooting Group," in which the fronds are always simply pinnate (never divided to the midrib more than once), and the midrib is often elongated and takes root at its apex, where a new plant in all respects similar to the parent is thus produced. *A. caudatum* may be given as a typical subject.

3.—POLYSOROUS (Pol-ys-or′-ous), or "Many-sori-bearing Group," composed of species with fronds once or more pinnate, the fruit disposed in numerous roundish, oblong, or kidney-shaped marginal patches. This group, probably the most important in point of numbers, is divided into three sections, as follows:

Section I.—Plants with segments (leaflets) not dimidiate (fully developed on one side only, scarcely if at all on the other), but of regular expansion, extending on both sides alike and having two more or less distinct opposite rows of sori. Of this section *A. intermedium* is a very good illustration.

Section II.—This is composed of species with segments (leaflets) dimidiate, the stipes (stalks) naked and polished, and is well represented by *A. diaphanum*, known in commerce as *A. setulosum.*

Section III.—The plants composing this section have, like those of the preceding one, their segments dimidiate, but their stipes are pubescent (downy), as those of *A. Henslovianum.*

4.—OLIGOSOROUS (Ol-ig-os-or′-ous), or "Few-sori-bearing Group," composed of plants with fronds once or more pinnate, and the fruit disposed in continuous or slightly interrupted marginal lines. This group is also divided into two sections, according to the disposition of the sori.

Section I.—This comprises subjects in which the segments are provided with a line of fruit on both sides, and are, therefore, not dimidiate, as in *A. peruvianum* for example.

Section II.—The plants of this section have their segments dimidiate, with the line of fruit altogether absent from the lower margin, as in *A. pulverulentum.*

5.—CAPILLUS-VENERIS (Cap-il′-lus-Ven′-er-is). All the subjects belonging to this numerically very important group have their fronds at least bipinnate (twice divided to the rachis or midrib), their segments flabellato-cuneate (rounded at the top and wedge-shaped at the base), with the petiole (stalk) situated near the centre, and the sori kidney-shaped. These various characters are most distinctly shown in *A. Capillus-Veneris* and some of the Tropical American species with most minutely-divided fronds, such as *A. Wagneri* (known in commerce as *A. decorum*), *A. Moorei* (known in gardens as *A. amabilis*), *A. concinnum*, *A. tenerum*, &c.

6.—SCANDENTES (Scan-den′-tes), or "Climbing Group." In the few species belonging to this group, the plants are provided with stems or elongated stipes of a climbing nature, attaining several feet in length, and provided on their entire length with fronds tri- or quadri-pinnate: that is to say, either three times or four times divided to the rachis or midrib. The best illustration of this singular character is seen in the Mexican *A. Féei.*

7.—Pedatum (Ped-a′-tum), or "Foot-shaped Group." The fronds of the subjects belonging to this most distinct group are not pinnately branched, but are dichotomously forked: that is to say, after being divided into two parts these are repeatedly forked again; they have numerous pinnæ (leaflets) springing from the upper side of the two branches. These characters are best shown in the North American *A. pedatum.*

8.—Hewardia (Hew-ar′-dĭ-a). The species composing this group differ from all other known Adiantums principally through their veins being anastomosing (running into one another), a character which is well shown in *A. dolosum.*

It is in this extensive and very varied genus that most of the species of Ferns best adapted for decoration are to be found. On account of the black, shining stalks common to most of them, Adiantums are popularly known as Maidenhair Ferns, an appellation which is also frequently shared by our native *Asplenium Trichomanes*, whose stipes (stalks) are of a nature very similar to that which, at first sight, distinguishes Adiantums from all other Ferns. Some of them are of the greatest utility for making bouquets, wreaths, &c.: foremost among these is *A. cuneatum*, by far the commonest of all kinds now in cultivation, but which will not be easily superseded by any new-comer; for, besides the natural gracefulness common to the fronds of this species, it has the immense advantage of producing them in greater abundance than most of the other kinds at present known. For the same purpose also, *A. Ghiesbreghti* (commonly designated *A. scutum*), *A. æmulum*, *A. Wagneri* (better known as *A. decorum*), although not so much in demand, are very useful. For large vases, where green and elegant foliage is often required for intermixing with flowers of more than ordinary sizes, such as Gladioli, Lilies, &c., what can be more appropriate, and produce better and more pleasing effect, than the massive fronds of *A. tenerum Farleyense* (generally known as *A. Farleyense*), the light-coloured and gigantic fronds of *A. polyphyllum* (popularly known as *A. cardiochlæna*), or the darker foliage of *A. formosum?*

But it is not for cutting purposes only that Adiantums are so justly appreciated. As "collection plants" there is no genus equal to them amongst Ferns; indeed, a judicious selection of the best sorts only will produce a greater variety of forms and tints than could be found in any other. There are numerous dwarf-growing forms of *A. cuneatum* and of *A. Capillus-Veneris*, all very pretty, and equally useful for edgings in the Fernery. Then there are, besides the gigantic forms already mentioned, the deservedly-popular *A. trapeziforme*, *A. peruvianum*, *A. Seemanni*, and others too numerous to be mentioned here. Again, we have some whose shape and general habit are totally different from ordinary Adiantums: such as, for instance, the curious *A. reniforme*, with its kidney-shaped fronds borne on slender, shining stalks; or the lesser-known form, *A. asarifolium*, with broad, entire fronds perfectly round, and measuring sometimes as much as 3½in. across. Very strange, also, is the general appearance of *A. Féei*, whose climbing fronds expand to very great dimensions, and whose stalks are quite hairy and of a perculiarly ferruginous (rusty) colour. There are also various kinds whose foliage is of a peculiarly metallic hue, and numerous others, such as *A. macrophyllum*, *A. tinctum*, &c., which are exceedingly interesting through the beautiful rosy colour of their splendidly-tinted fronds in their young state. Then we have the golden and silvered forms of *A. æthiopicum*, respectively called *sulphureum* and *scabrum*, which of late years have become exceedingly rare; and also the pendulous kinds, *A. caudatum* and *A. lunulatum*, so well adapted for growing in suspended baskets, that one may confidently assert that a collection composed exclusively of Adiantums is most interesting.

Culture.

With the exception of the North American *A. pedatum*, none of the Adiantums are truly hardy; even our native species, *A. Capillus-Veneris*, requires protection. They are, as a rule, easy to manage. Plenty of light should be allowed to all of them, but the full rays of the sun should, as with nearly all other Ferns, be carefully avoided. A mixture of fibrous peat, or of partly-decayed leaf mould, loam, and silver sand, in about equal parts, will suit most of them. None of them like to be potted very hard, and watering or syringing overhead, unless it be in a very airy, light, and warm house, is injurious to most of them.

The propagation of all kinds of Adiantum provided with running rhizomes (underground stems) may with advantage be effected by the division of the same, an operation which is best performed from February to April. Species with tufted crowns may also be increased by division, but in their case, and especially when quantities of plants are required, it is safer and more advantageous to depend on spores (seeds), which germinate freely, and which usually produce stronger and more shapely plants than those resulting from the division of the crowns. The spores may be sown with perfect safety at all times of the year, although the most favourable season is from January to April, as in that case the young seedlings have ample time to produce crowns sufficiently strong to withstand the effects of the following winter.

So many of the most popular names in this very extensive genus have been for such a long time in constant use, that—with the general public—they have entirely superseded the botanical ones. For instance, *A. cardiochlæna*, *A. decorum*, *A. Farleyense*, *A. amabile*, *A. scutum*, and *A. setulosum*, are much better known by these appellations than by their botanical names of *A. polyphyllum*, *A. Wagneri*, *A. tenerum Farleyense*, *A. Moorei*, *A. Ghiesbreghti*, and *A. diaphanum*, of which the public knows but very little, but to which it should be educated. It has therefore appeared to us necessary, in a book of reference such as the present one is intended to be, not only to enter any of the said plants having a recognised popular name in their proper places, but at the same time to give them a place in the general nomenclature, so as to simplify the task of identification, which frequently is an arduous one when the synonyms are not given.

Principal Species and Varieties.

A. æmulum—æm′-ul-um (rivalling), *Moore.*

This Brazilian species, which thrives under either stove or greenhouse treatment, though not attaining very large dimensions, is one of the most useful of the numerous kinds with small foliage for decoration. Its fronds, of a particularly light and elegant appearance, are produced in great abundance from a close, tufted crown, showing no signs of running or creeping underground stem. They are borne on particularly slender stipes (stalks), 4in. to 6in. long, and their foliaged part, which at most measures 10in. in length, is in the form of a triangle, somewhat narrow at the base, quadripinnate (four times divided to the rachis or midrib), and furnished with distinct lateral pinnæ (leaflets), also of a triangular shape. The leaflets are, in their turn, subdivided into numerous pinnules (leafits), of rhomboid (oblong) shape, deeply notched, and tapering to the base; the terminal pinnule is distinctly cuneate (wedge-shaped), and, like the others, is borne on a very slender, short, thread-like stalk. The colour of the foliage is one of the darkest greens known among Adiantums. The sori (patches of spores) are disposed two to four to each segment, and are round or nearly so.—*Nicholson*, *Dictionary of Gardening*, i., p. 24.

A. æthiopicum—æth-ĭ-op′-ic-um (Ethiopian), *Linnæus.*

This species, which may be grown with equal success in either the intermediate or the warm house, has a most extensive range of habitat, being found on the Cameroon Mountains, at an elevation of 7000ft., in Natal, Cape Colony, Bourbon, Madagascar; also on the Neilgherries, in New Zealand, in tropical as in temperate parts of Australia; in America, from Texas and California southward to Valparaiso and Monte Video, &c. Its fronds, 1ft. to 1½ft. long and 6in. to 9in. broad, triangular in shape, three or four times divided to the rachis (midrib), are of a soft, herbaceous texture, and are borne on stipes (stalks) 6in. to 9in. long, produced from slender rhizomes (underground stems). They are furnished with numerous pinnæ (leaflets), the lower ones 3in. to 4in. long and 2in. to 3in. broad; these are again divided into sub-orbicular (nearly round) pinnules (leafits), of a thin, transparent texture, from ¼in. to ½in. across, and the upper part of which is deeply lobed. The sori (groups of spores) in this species are disposed in several roundish patches.—*Hooker*, *Species Filicum*, ii., p. 37, t. 77. *Nicholson*, *Dictionary of Gardening*, i., p. 24.

Several popular kinds, usually given as species, are by Hooker and Baker considered so closely related to *A. æthiopicum* as to be regarded as simply forms of this very variable species. These differ either in size, in habitat, or in the texture of their fronds, to such an extent as to appear quite distinct from it; but having decided to follow the nomenclature adopted in the "Synopsis Filicum," the most striking of these forms, notwithstanding the apparent distinctive characters possessed by them, are accordingly given here as varieties of *A. æthiopicum.*

A. æ. assimile—as-sim′-il-ĕ (assimilated), *Swartz.*

This essentially Australian Maidenhair Fern, which thrives best under cool treatment, is given in the "Synopsis Filicum," p. 123, as well as in Nicholson's "Dictionary of Gardening," i., p. 25, as "an Australian form of the widely-distributed *A. æthiopicum.*" In Lowe's "Ferns, British and Exotic," vol. iii., an excellent plate (t. 8) is given with the information that *A. assimile* is a common Fern in Australia, and one which appears to vary considerably in different situations. The form generally met with in cultivation in this country is that which is found in its wild state growing in low, damp situations; it is of comparatively small dimensions; its delicate fronds, which are slender, measure, with the stalks on which they are borne, 10in. to 12in. in length; they are glabrous (smooth), tripinnate (divided three times to the rachis or midrib), and furnished with numerous pinnules (leafits) of a peculiarly vivid green colour, of oblong shape, wedge-shaped at the base, and slightly crenate (dented) at the edge. These fronds are produced from a thin, wiry rhizome (stem creeping underground), and for that reason the plant is well adapted for growing in suspended wire baskets, for which purpose it is extensively used, as it covers them all round in a very short time with a mass of light and elegant foliage. It is of a deciduous nature: that is to say, its fronds generally disappear about November, and the plant starts growing afresh about February. It is almost, if not quite, hardy in some sheltered situations, as Lowe mentions specimens of it which have lived outdoors for five consecutive years without any special protection. This pretty Fern is found in a wild state in Tasmania, New South Wales, Australia, New Zealand, &c. Besides the works enumerated above in which it is mentioned, it is also found in Hooker's "Species Filicum," ii., p. 37.

A. æ. a. cristatum—cris-ta′-tum (crested).

This is a sub-variety, of garden origin, with fronds of dimensions similar to those of the plant last described, but elegantly crested, their extremity, as well as the points of the pinnæ (leaflets), terminating into a tassel of a size proportionate to the vigour of the plant.—*Nicholson, Dictionary of Gardening*, iv., p. 484.

A. æ. emarginatum—e-mar-gin-a′-tum (notched at the end), *Bory.*

This very handsome, greenhouse Fern is known in North America under the name of Californian Maidenhair Fern. In Eaton's beautiful work, where a splendid plate of it is produced, it is given as a form of *A. Capillus-Veneris*, which species it certainly resembles very much by its growth and by the nature of its thick, fleshy rhizome (underground stem), as also by the texture of its fronds—"growing among rocks and in cañons, both moist and dry, from San Diego, California, to Oregon, not rare on the Coast Ranges, but apparently unknown east of them." It is essentially distinct from the species to which it is said to be related through the shape of its pinnules (leafits), which are sometimes roundish, but more frequently broader than long, so as to be semicircular, like those of *A. lunulatum*, or even slightly reniform (kidney-shaped). They are commonly either truncate (abruptly terminating) at the base, or broadly wedge-shaped, and are borne on slender footstalks three to five lines long. In the sterile fronds the outer margin of these pinnules is finely and sharply toothed; but in the fertile fronds the teeth are found only at the extreme sides of the pinnules, and the margin of the lobes is recurved (bent back). The fronds themselves, borne on stipes (stalks) 6in. to 9in. long, are about 1ft. in length, and nearly or quite half as wide as they are long; the largest ones are tripinnate (three times divided to the rachis or midrib) in the lower part, bipinnate (twice divided to the midrib) in the middle, and simply pinnate (divided only once to the midrib) towards the apex, where the pinnæ (leaflets), which are of a thin, papery texture, clear green above and slightly paler beneath, overlap each other more or less according to the vigour of the subjects.—*Hooker, Species Filicum*, ii., p. 39, t. 75. *Nicholson, Dictionary of Gardening*, i., p. 26. *Eaton, Ferns of North America*, i., t. 38.

A. æ. chilense—chil-en′-sĕ (Chilian), *Kaulfuss.*

The fronds of this greenhouse, Chilian form are about 1ft. long, including the stalks on which they are borne; they are triangular, tripinnate (three times divided to the midrib), and furnished with roundish pinnules (leafits) of a glaucous or bluish-green, and of a very coriaceous (quite leathery) texture, in which respect they differ essentially from those of the species to which they are said to be related. These fronds are produced from a very short, running rhizome (underground stem), of a woody nature, also quite different from the same organ in *A. æthiopicum.*—*Hooker*, *Synopsis Filicum*, p. 123.

A. æ. scabrum—scab′-rum (rough), *Kunze.*

This lovely little greenhouse Fern, popularly known as the Silver Maidenhair, native of Chili, is of very compact habit. Its very interesting fronds, which are produced in great quantities from a tufted crown, seldom attain more than 9in. in length, including the slender stalks on which they are borne. They are tripinnate (three times divided to the rachis or midrib), triangular in outline, and furnished with pinnules (leafits) of a peculiar semi-orbicular or kidney shape, dusted on both sides with a white farinose powder.—*Hooker*, *Synopsis Filicum*, p. 123.

This little gem, which is now seldom met with in cultivation, is generally considered to be a difficult plant to grow, but it is only on account of its being kept in too great heat and with too much moisture around it. I have grown it, and seen it grown best—indeed to perfection—on a dry shelf with Cacti, and with a very little allowance of water during the winter, in the cold house.

A. æ. sulphureum—sul-phur′-ĕ-um (sulphur-yellow), *Kaulfuss.*

This beautiful dwarf, evergreen kind, native of Chili, Conception, and Peru, which is popularly known as the Golden Maidenhair, is a fit companion to the one just described. As is the case with the Silver Maidenhair, the fronds of this Golden one are produced in great abundance from a tufted crown, and neither of the plants shows any signs of the running rhizomes (underground stems) characteristic of *A. æthiopicum*, to which they are said to be related. The fronds seldom attain more than 8in. in length, including their stipes (stalks), and are tripinnate (three times divided to the rachis or midrib); they are furnished with pinnules (leafits), roundish when barren, but slightly incised (notched) on their edges when fertile, of a deep green colour on their upper surface, and thickly covered on their under-surface with a farinose powder of a more or less intense bright-golden colour.—*Hooker, Synopsis Filicum*, p. 123. *Lowe, New and Rare Ferns*, t. 61.

This variety is always regarded as a difficult subject to manage; it is, however, well-deserving of any extra trouble it may cause, but will succeed under the same treatment as *A. œ. scabrum*, viz., on a dry shelf in the cold house, with little water during the winter.

A. affine—af-fi′-nĕ (related), *Willdenow*.

This very decorative greenhouse species, commonly known as *A. Cunninghamii* (Cun-ning-ham′-ĭ-i), is very distinct from the *A. affine* of Hooker; it is a very variable plant, both in the branching and in the size of the segments, and is not likely to be mistaken for any other, as it is known only in the Northern Island of New Zealand, where it is found in damp woods at a high elevation. Its fronds, bipinnate (twice divided to the rachis or midrib), and measuring from 10in. to 12in. long, are borne on stipes (stalks) 6in. to 9in. long and furnished with long, red scales, and have one terminal pinna (leaflet), 4in. to 6in. long and 1in. to 1½in. broad, and several lateral pinnæ of smaller dimensions, the lowest of which are again branched. The pinnules (leafits), of a sub-coriaceous (almost leathery) texture, of a dark, dull green colour above, and glaucous (bluish-green) underneath, ½in. to ¾in. long and ¼in. deep, are dimidiate (fully developed on one side and scarcely at all on the other). The fronds are produced in abundance from a creeping rhizome (prostrate stem), covered with rough scales of a dark brown colour. The sori (groups of spores) in this species are numerous and nearly round.—*Hooker, Species Filicum*, ii., p. 52, t. 86. *Nicholson, Dictionary of Gardening*, i., p. 24. *Lowe, Ferns British and Exotic*, iii., t. 12.

A. amabile—am-a′-bil-ĕ (lovely). A garden name for *A. Moorei.*

A. amœnum—am-œ′-num (pleasing). Synonymous with *A. flabellulatum.*

A. andicolum—and-ic′-ol-um (native of the Andes). A garden name for *A. glaucophyllum.*

A. aneitense—an-ei-ten′-sĕ (from Aneitum), *Carruthers.*

This decorative species, native of the Aneitum Island, grows equally well under greenhouse or stove treatment. Its fronds, 1½ft. to 2ft. long, and three times pinnate, are deltoid in shape (their outline having a resemblance to the Greek delta, Δ), and are furnished with numerous pinnules (leafits), about ½in. long, rhomboidal (representing a quadrangular figure whose sides are equal), nearly sessile (stalkless), and whose inner side is close to the rachis (midrib); the lower ones are shallowly lobed. The fronds are borne on stipes (stalks) of a particularly rigid nature, and proceeding from a short-creeping rhizome (prostrate stem) of a very scaly texture. The sori (patches of spores), from four to six to a pinnule, are roundish or reniform (kidney-shaped), and disposed in the centre of the lobes. See Plate (for which we are indebted to Messrs. W. and J. Birkenhead).—*Hooker, Synopsis Filicum*, p. 472. *Nicholson, Dictionary of Gardening*, i., p. 24.

A. asarifolium—as-ar-if-ol′-ĭ-um (Asarum-leaved). Given in the "Synopsis Filicum" as simply a form of *A. reniforme.*

A. assimile—as-sim′-il-ĕ (assimilated). A form of *A. æthiopicum.*

A. Bausei—Baus′-ĕ-i (Bause's), *Moore.*

This beautiful Fern, of garden origin, given by Moore as a possible hybrid between *A. trapeziforme* and *A. Wagneri* (*A. decorum*), thrives equally well in either the intermediate or the warm house. Although partaking of some of the characters of both species above named, it is quite distinct from either of them, as indeed from any other Adiantum, through the contracted and deflexed character of its foliage. Its peculiar fronds, which are produced from a central, tufted crown, reach quite 2½ft. in length, including the robust, ebony, upright, black stipes (stalks) on which they are borne. They are spreading, triangular in shape, and tri-quadripinnate (three or four times divided to the midrib), and are furnished with numerous broad pinnules (leafits) peculiarly deflexed, of various shapes, according to the place they occupy on the leaflets: the basal ones being ovate (egg-shaped) with a truncate (abruptly terminating) base, the intermediate ones somewhat trapeziform (having the four sides unequal), the terminal ones cuneate (wedge-shaped), all slightly lobed and pedicellate (borne on short stalks). The whole of the foliage is of a beautiful light green colour, and the general appearance of the plant is that of a weeping *A. tenerum* of strong growth and of upright habit. The sori (spore masses) are of oblong, kidney shape, and set across the extremity of the lobes. See Plate (for which we are indebted to Messrs. W. and J. Birkenhead).—*Nicholson*, *Dictionary of Gardening*, i., p. 24.

A. bellum—bel′-lum (handsome), *Moore.*

A greenhouse species, of small dimensions, native of Bermuda. Its short, tufted fronds, 3in. to 6in. long, including the stalks, are bipinnate (twice cut down to the midrib) and furnished with pinnæ (leaflets) composed of five or six pinnules (leafits) only ; the pinnæ are cuneate (wedge-shaped) ; the terminal ones, of the same shape, are lobed, with their margins erose (gnawed) all round them, and all are borne on short stalks. The sori (spore masses) are roundish, or sub-lunate (crescent or half-moon shaped), disposed by two or three on the smaller pinnules only.—*Nicholson*, *Dictionary of Gardening*, i., p. 24.

A. Bennettii—Ben-net′-tĭ-i (Bennett's), *Carruthers.*

In this distinct, stove species, from the Sandwich Islands, the fronds, about 1ft. long, and borne on black, naked stalks, are deltoid (in form like the Greek delta, Δ), twice or three times divided to the midrib, and furnished with numerous pinnules (leafits), broader than deep, ½in. to ¾in. broad, entire (undivided), of a somewhat rounded, heart shape, and borne on pedicels (stalks) three to four lines long. These pinnules are of a membranous (thin and transparent) texture, with their upper surface glabrous (smooth), while their under-side is densely bristly. The sori (spore masses) in this singular species are reniform (kidney-shaped), one to two lines broad, and are crowded round the outer border of the pinnules (leafits), where they are disposed from six to ten on each fertile segment.—*Hooker*, *Synopsis Filicum*, p. 473.

A. Birkenheadii—Birk-en-head′-ĭ-i (Birkenhead's), *Moore.*

This is undoubtedly one of the handsomest of the numerous Ferns of garden origin, and thrives equally well in the intermediate or in the warm house. Its handsome fronds, produced from a tufted crown, are tripinnate (three times divided to the midrib), about 2½ft. long, including their stalks, and 1ft. broad. Their pinnæ (leaflets) are alternate (apparently disposed without regularity), distant and long-stalked towards the base, closer set together and sessile (stalkless) near the apex ; the lower ones are bipinnate (twice divided to the midrib), the upper ones pinnate (only once divided to the midrib) ; the pinnules (leafits) are of an oblong-trapeziform (oblong and with the four sides unequal) shape, and are cut on the upper edge into shallow lobes. The stalks on which the fronds are borne are slender and of a somewhat rough nature, similar in that respect to those of *A. diaphanum* (*A. setulosum* of commerce). Indeed, the plant resembles a much-enlarged edition of that lovely species, from which it is supposed to have originated, and the peculiar way in which it reproduces itself from the bulbils formed on its fibrous roots seems to point to its origin. It has, until now, proved quite barren. See Plate.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. Bournei—Bour′-nĕ-i (Bourne's). A form of *A. cuneatum.*

A. brasiliense—bras-il-ĭ-en′-sĕ (Brazilian). A form of *A. curvatum.*

A. bulbiferum—bul-bif′-er-um (bulb-bearing). A variety of *A. Capillus-Veneris.*

A. Burnii—Bur′-nĭ-i (Burn's), *Moore.*

A very decorative form, of garden origin, requiring stove temperature. Its evergreen, smooth fronds, broadly oval (broader at the base than at the extremity) and acuminate (terminating in a long, tapering point), are three and frequently four times divided to the midrib. They are furnished with pinnæ (leaflets) of the same shape as the foliaged part of the frond itself; the lower ones are provided with a long stalk, and the upper ones are almost sessile (stalkless). The pinnules (leafits), which are very numerous, are stipitate (supported on stalks) below: the basal one is 2in. to 2½in. long, narrowly ovate and compound (further subdivided) ; the upper ones are narrower still, being less divided at the base. The sori (spore masses), which in this garden hybrid are very numerous, are of a roundish kidney-shape, and situated at the base of a notch at the apex of the lobes.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. calcareum—cal-ca′-rĕ-um (limey), *Gardner.*

This stove species, native of the province of Goyaz, Brazil, belongs to the "Radicantes" Group, of which it is one of the smallest growers. Its gracefully-pendulous fronds, simply pinnate (only once divided to the midrib), and prolonged through their peculiar habit of rooting at the extremity, are from 4in. to 6in. long, and are borne on slender, filiform (thread-like) stalks, of a polished and naked nature, and of a bright black colour. They are furnished with pinnæ (leaflets) ¼in. to ½in. broad and ¼in. deep, of a thin, papery texture, and varying in shape from a quarter to nearly half a circle; the pinnæ are lobed from the circumference towards the centre two or three times half the way down, and the main lobes are cleft again, but less deeply. The sori (spore masses) in this species are roundish or oblong, and disposed in small depressions at the summit of the lobes.—*Hooker*, *Species Filicum*, ii., p. 15.

A. Capillus-Junonis—Cap-il′-lus-Ju-no′-nis (Juno's hair), *Ruprecht.*

This greenhouse species, also known under the name of *A. cantoniense* (can-ton-ĭ-en′-sĕ), it having been gathered by Hance on the ramparts of Canton, belongs, like the preceding one, to the "Radicantes" Group. Its general aspect is somewhat that of a diminutive form of the better-known *A. lunulatum*, for its fronds, simply pinnate (only once divided to the midrib), seldom exceed 8in. in length, including the slender, polished stalk, of a blackish colour, on which they are borne. They are furnished with a terminal leaflet, which equally possesses the peculiarity of rooting at its extremity, and three to five pairs of opposite leaflets, about ½in. in breadth, sub-orbicular (nearly round), very slightly lobed, borne on short stalks, and of a pellucid (transparent) texture. The sori (spore masses) in this species are roundish or transversely oblong, scantily produced, and disposed round the outer edge, where they are not contiguous.—*Hooker*, *Species Filicum*, p. 114.

A. Capillus-Veneris—Cap-il′-lus-Ven′-er-is (Venus's hair), *Linnæus.*

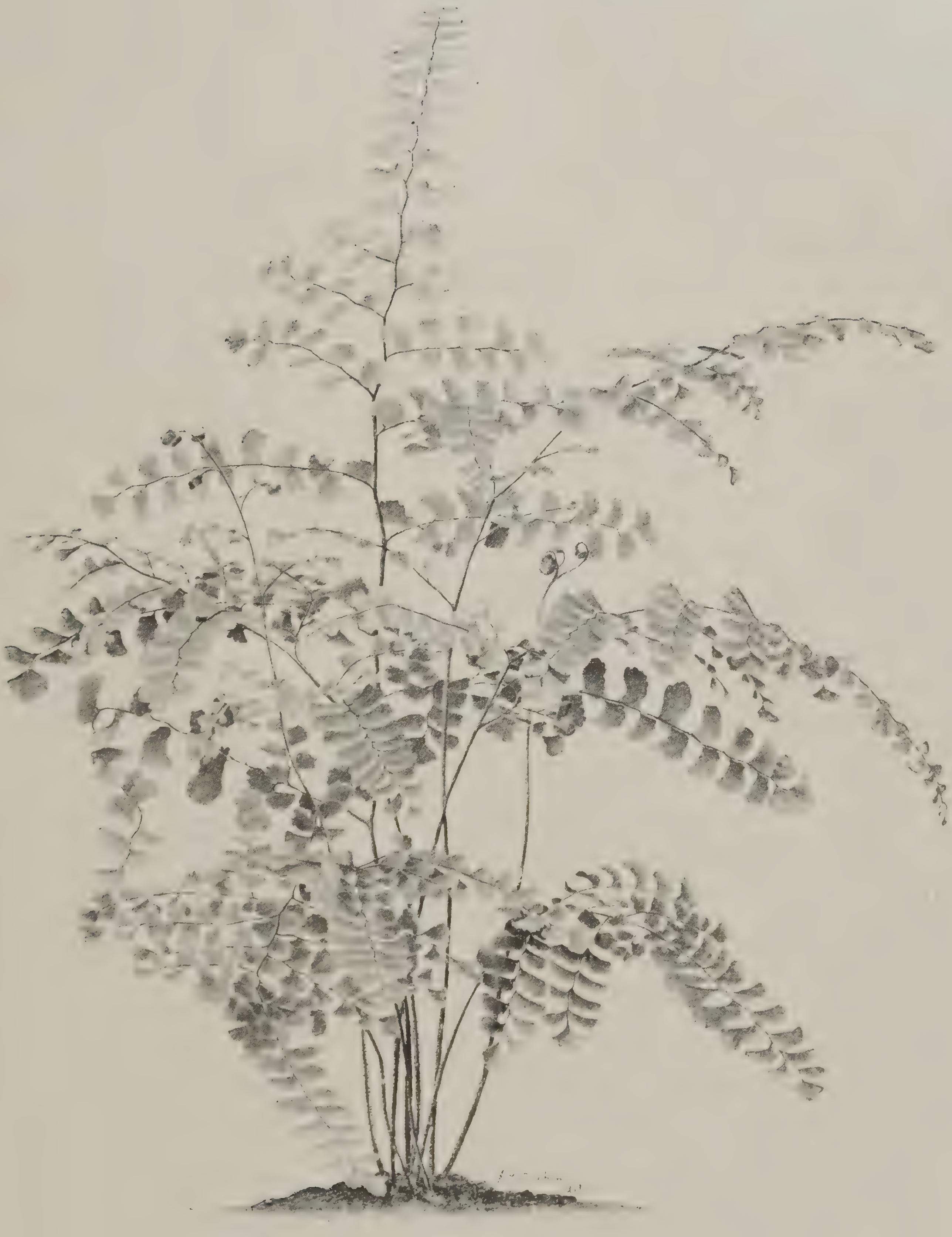
This species, to which the popular appellation of Maidenhair, common to all Adiantums, owes its origin, is, from a decorative point of view, the one which undoubtedly renders the greatest services. As a wall or as a rock plant it is invaluable, for the creeping rhizomes (prostrate stems) with which it is provided—and which, according to the more or less favourable situations in which the plant is found, vary in thickness from that of a quill pen to that of a man's finger—produce in great abundance a foliage noted for its elegance and delicacy. The running rhizomes of this species, and of its varieties, are easily distinguishable from all others, not only by the scales, of a dark brown colour, with which they are densely clothed, but also through the property which they possess of firmly attaching themselves to any material with which they are brought into contact. This adhesive character, peculiar to members belonging to this group of Adiantums, is, in the case of *A. Capillus-Veneris* and varieties, developed to such an extent that it may be safely stated that the presence of soil in their culture is only a matter of secondary importance; for, if young seedlings originate on a perfectly bare brick wall, or on rockwork, there is not the slightest difficulty in establishing them in such a situation, and, provided a constantly moist atmosphere and a temperature of 50deg. to 55deg. can be depended upon, they soon form a complete mass of foliage, springing from their matted rhizomes, which have no other food than the moisture they derive from the walls.

The geographical range of this lovely species is very extensive—it may, in fact, be said to be world-wide in its distribution, for it is found in a wild state throughout Central and Southern Europe, from the Jura and Tyrol Mountains, to Sicily, Portugal, and Greece, where it is found in profusion, adorning the brooks and rivulets, with its elegant fronds often attaining a height of 1½ft.; in Asia, plentiful on the Caucasus and in South-east China and Japan, in Persia, in Syria, and in the Polynesian Islands; in Africa, Cape of Good Hope, Abyssinia, Natal, in the Niger Valley, and in the Mascarene Islands; while among the many Indian and other localities described by Dr. Hooker the following are the most important: Malabar, Nepal, Simla, Bhotan, Assam, Sikkim-Himalaya—where it is found up to 6000ft. elevation—Cashmere, Thibet, and Afghanistan. It is also abundant in some parts of North America, where, according to Eaton, it grows in moist, rocky places, especially about springs and along water-courses, from Wilmington, North Carolina, to Florida, Alabama, Texas, Utah, Arizona, Venezuela, and the Amazon Valley. The islands of the Mediterranean, Teneriffe, Madeira, Canaries, Azores, and Cape de Verde, also produce it in great quantities.

Tourists and Fern hawkers have, by their depredations, greatly reduced the number of places where the Maidenhair grows, or rather grew, in England; but it is comforting to know that the plant is still found at Carclew, St. Ives, and Hayle, in Cornwall; at Ilfracombe, Rillidge Point, Watermouth, and Brixham, in Devonshire; at Dunraven and Barry Island, in Glamorganshire;

and at Glen Meay, in the Isle of Man; while in Ireland it is still more profusely spread, for it is found in Galway, Kerry, the Arran Isles, and Clare; it also grows on the banks of the Carron, in Scotland. Indeed, Australia and New Zealand are, we believe, the only places where the existence of *A. Capillus-Veneris* is not recorded.

The fronds, 8in. to 18in. long, are generally of a lengthened triangular or ovate (egg-shaped) form, occasionally lanceolate (spear-shaped) or oblong; they are membranaceous and pellucid (of thin and more or less transparent texture), sometimes bipinnate (twice divided to the midrib), but at other times tripinnate (three times divided to the midrib), and furnished with numerous segments or pinnules of a bright green colour, perfectly smooth, ½in. to 1in. broad, with the base cuneate (wedge-shaped), the outer edge rounded, deeply lobed from the circumference in the direction of the centre, and the lobes again bluntly crenated (dented), and borne on very slender, thread-like, short stalks. The lower sides of the leaflets are entire, and usually slightly concave; the upper, or outer, margin is more or less incised or lobed; and the lobes in the American form are usually denticulated (toothed), and sometimes very sharply so, especially in those from Utah and California. In fertile fronds, the teeth either disappear or are seen only on the upper part of the sides of the lobes, while the ends or summits of these lobes are occupied by the lunate (crescent-shaped) or oblong sori (spore masses), which vary in length according to the width of the lobe. The fronds are borne on stipes (stalks) of a rather slender nature, 4in. to 9in. long, polished, of a purplish-black colour, and furnished with a few scales near the base, whereas the rest of them is quite naked and smooth. The roundish or reniform (kidney-shaped) sori are placed in the roundish sinuses (depressions) of the crenations. Whenever it grows luxuriantly, this Fern is more or less pendent in habit; but plants of moderate size commonly have their fronds erect (upright), or but very slightly recurved (bent in a backward direction). Certain forms which by some authors are considered as distinct species, though varying only in their increased size, owe their more robust character no doubt to the warmer atmosphere to which they are naturally subjected, and it is very doubtful whether they are really distinct.—*Hooker, Species Filicum*, ii., p. 36. *Nicholson, Dictionary of Gardening*, i., p. 25. *Lowe, Native Ferns*, ii., t. 62; *Ferns British and Exotic*, iii., t. 15. *Eaton, Ferns of North America*, i., t. 37.



Adiantum Birkenheadii

(⅕ nat. size).

Although classed among our native Ferns, the British Maidenhair is of too tender a nature to bear a very cold temperature: the least frost injures it, and a severe frost kills it. It is a very accommodating plant as regards heat, and not at all fastidious in its habits, for it grows equally well in a heated frame, in the greenhouse, or in the moist, shady part of a stove. In Europe, it is essentially a coast plant, being found growing exclusively in caves and fissures of rocks near the sea level, generally in a shady situation where there is an abundant supply of moisture. When this Fern is grown in pots an abundant drainage is essential, and the soil which it prefers is a compost of a light nature, made of turfy peat, leaf mould, and lime rubbish, in equal parts; it is also necessary that the rhizomes (prostrate stems) should be kept on the surface of the soil.

This useful species has produced, either spontaneously or under cultivation, many varieties, some of which are remarkably handsome: all of them share the comparatively hardy character of the species. We give twenty of the most distinct and the most interesting:—

A. C.-V. bulbiferum—bul-bif′-er-um (bulb-bearing), *Lowe.*

This variety differs from the species in bearing little bulbils on the leaflets, and is, so far as we know, the only one possessing that character.—*Lowe*, *Native Ferns*, ii., fig. 838.

A. C.-V. cornubiense—cor-nu-bĭ-en′-sĕ (Cornish), *Moore.*

This is one of the prettiest of all forms in cultivation. It is of dwarf and compact habit, and its fronds, seldom more than 8in. long, including the stalks, are produced in abundance; they are more or less oblong in general outline, and are furnished with pinnules (leafits) of a deep green colour, of firm texture, though nearly transparent and prettily undulated at the edges.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. crispulum—cris′-pul-um (slightly crisped), *Moore.*

A very handsome form, of robust and vigorous habit, having fronds 10in. to 15in. long, furnished with leaflets less numerous than in the type, but broader and thin, crisp, of a light green colour, and more or less cut at their broadest part.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. daphnites—daph-ni′-tēs (glistening), *Moore.*

This is a most distinct form, with fronds 8in. to 12in. high, and of erect habit. The leaflets as well as the extremity of the fronds, which terminate in a flattened crest some 2in. in breadth, are of a dull green colour, and curiously crisped and dilated, giving the plant a singular, semi-crested appearance.

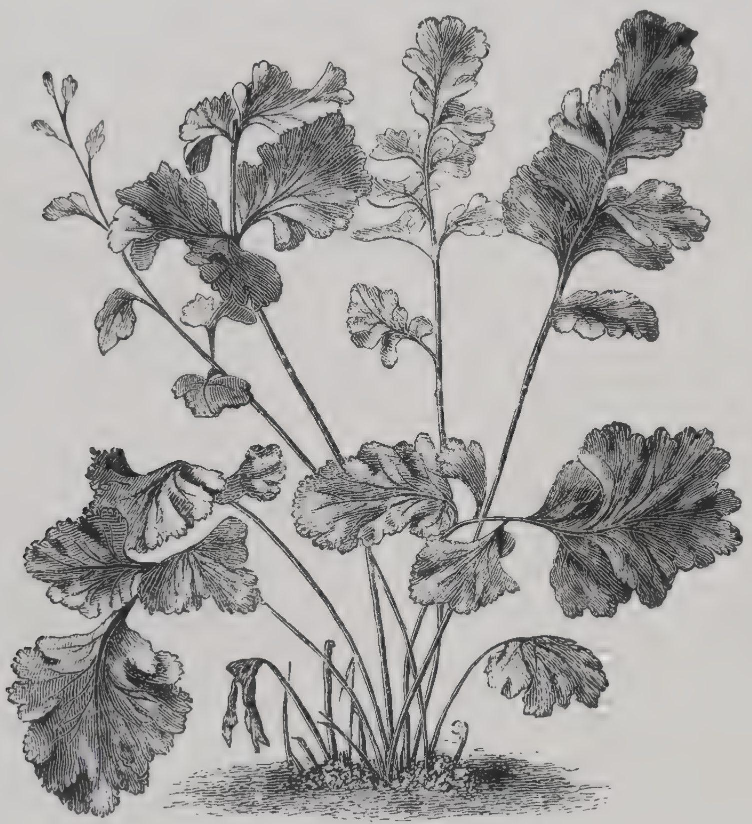


Fig. 33. Adiantum Capillus-Veneris daphnites (¼ nat. size).

Mr. C. T. Druery states, in the "Gardeners' Chronicle," 6th August, 1887, p. 170, that he has received from Mr. Greenwood Pim, of Monkstown, county Dublin, a frond of this variety upon which a remarkable form of proliferation appears. In this case there are, says Mr. Druery, clusters of young plants protruding from under the natural indusia (coverings of sporangia or seed vessels), and upon examination it appears that the sporangia have become transformed directly into Ferns of the spore-bearing generation, instead of first developing into prothalli, as the first rudimentary development from the spores is termed, as in cases of Apospory: a mode of reproduction which, Mr. Druery says, is differentiated from all others so far recorded. The nearest approach is the transformation of sori (spore masses) and indusia (their natural coverings) into solitary buds or scales, which has been found to occur on several plumose forms of *Asplenium* (*Athyrium*) *Filix-fœmina*, as illustrated in our Chapter on "Fertilisation and Propagation," Fig. 10, p. 141. See Fig. 33.—*Nicholson, Dictionary of Gardening*, i., p. 25.

A. C.-V. depauperatum—de-pau-per-a′-tum (poor), *Clapham.*

This most interesting sport, or natural hybrid, found by Mr. James, of Vauvert, amongst a batch of seedlings, is entirely distinct from all other known forms of our native Maidenhair Fern. Its erect fronds are narrow, about 1ft. long; their pinnules (leafits) are much cut, and in some cases reduced to mere thread-like segments.—*Lowe*, *Native Ferns*, ii., p. 421, fig. 836.

A. C.-V. digitatum—dig-it-a′-tum (finger-like), *Moore.*

A curious variety, of dwarf habit and evergreen nature, whose fronds, instead of being symmetrical, as is usually the case, have a tendency to become unequally ovate (much broader at the base than at the summit). These are furnished with unequal and irregular leaflets, the most perfect of which are rhomboid in form (with four sides equal, though not forming a square), rounded at their upper margin, with lobes deeply incised and slightly dented at the edges. This is a constantly barren form.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. C.-V. fissum—fis′-sum (divided), *Moore.*

A very elegant form, of dwarf habit, having erect fronds furnished with pinnules (leafits) rather broader than those of the type, but deeply cut into segments of various sizes and forms, which give the plant an appearance distinct from all other known varieties. It is a most pleasing Fern for the conservatory, as not only is it neat in habit, but the pinnules are of a bright green colour, and they last a very long time on the plant.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. Footi—Foot′-i (Foot's), *Lowe.*

A very handsome variety, having fronds 1½ft. to 2ft. long, furnished with broad pinnules (leafits), some of which are as much as 1in. wide. Found at Ballyryan, county Clare, by Mr. J. F. Foot.—*Lowe*, *Native Ferns*, ii., fig. 835.

A. C.-V. grande—gran′-dĕ (large), *Moore.*

In this variety, which is much more bushy in habit than the type, although the foliage is quite as long, the fronds have a plumose (feathery) appearance, produced by the much larger size of their pinnules (leafits), which are undulated and conspicuously serrated (like a saw) at their edges; they are of a very light green colour, and gracefully pendulous.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. C.-V. Hookeri—Hook′-er-i (Hooker's), *Lowe.*

This very peculiar form, native of the Crimea, recedes from the type towards *A. cuneatum.* It is remarkably slender in all its parts, and is of a particularly close, thick-set, erect habit. The pinnæ (leaflets) and their ultimate sub-divisions are disposed alternately (not opposite); the latter are cuneate (wedge-shaped) at the base, and very finely dented at their summit, which is naturally rounded or fan-shaped.—*Hooker*, *Synopsis Filicum*, p. 123. *Lowe*, *Native Ferns*, ii., fig. 834.

A. C.-V. imbricatum—im-bric-a′-tum (overlapping), *Moore.*

By far the handsomest of all varieties of *A. Capillus-Veneris* at present known. Its fronds are ovate (egg-shaped, much broader at the base than at the summit), from 8in. to 10in. long, tripinnate (three times divided to the midrib), and evergreen. They are borne on particularly slender stalks, and consequently are very pendulous, and are furnished with pinnæ (leaflets) set close together, 3in. to 3½in. long and about 2in. broad; the pinnules (leafits), of a very light or pale green colour, are large, much overlapping, deeply cut from the outer edge towards the centre, and beautifully undulated; the lateral ones are rhomboid in form (having the four sides of equal size), whereas the terminal ones, 1in. or more in breadth, are broadly flabellate (fan-shaped), and borne on thread-like little stalks. The entire appearance of the plant, as far as size, colour, and disposition of leafits are concerned, is exactly that of the popular *A. Farleyense*, but it is essentially a cool-house variety and is of dwarfer habit. It is interesting to note that this plumose form of the common Maidenhair Fern, like most other forms of a plumose character, is entirely barren.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. C.-V. incisum—in-ci′-sum (deeply cut), *Moore.*

A very distinct variety, in which the pinnules (leafits) are split into long, narrow-cuneate (wedge-shaped) lobes, deeply serrated (saw-like) at the edges. It is very strange that such a distinct form should have originated spontaneously in localities so wide apart, for it has been collected in Ireland by Dr. Allchin; at Menstone Bay, Devonshire, by Mr. E. Newman; and at Guernsey by Mr. J. James. This plant is well illustrated in Lowe's "Native Ferns," ii., fig. 839.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. i. Footi—Foot′-i (Foot's), *Lowe.*

This is a more vigorous and remarkably handsome form of the preceding variety, found in county Clare by Mr. J. F. Foot, with fronds 1ft. or more long, furnished with ample leaflets of a light green colour and deeply cut. It is somewhat allied to the variety *fissum*, but is of a much more robust nature, and its much longer fronds, instead of being upright, are gracefully pendulous.—*Lowe*, *Native Ferns*, ii., fig. 833. *Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. Kalon—Ka′-lon, *Lowe.*

This is one of the very few forms of *A. Capillus-Veneris* raised artificially from spores in this country. Its distinct fronds are ovate (broadest at the base and gradually narrowing towards their summit), 11in. in length, and 5in. in breadth ; their large pinnules (leafits) are very leafy and closely set together.—*Lowe*, *Native Ferns*, ii., fig. 837.

A. C.-V. magnificum—mag-nif′-ic-um (magnificent), *Moore.*

In this fine and massive form the fronds often attain 1¾ft. in length and upwards of 4in. in breadth, while their arching character gives the plant a most distinct appearance. They are furnished with pinnules (leafits) much larger than those of the type, and of a softer, rich green colour. Their edges are prettily fringed, and overlap each other.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. C.-V. Mairisii—Mair-is′-ĭ-i (Mairis'), *Moore.*

This variety, which requires stove temperature in order to develop its foliage perfectly, and which was raised artificially, has all the appearance of a hybrid between *A. Capillus-Veneris* and *A. cuneatum.* Its fronds, quadripinnate (four times divided to the midrib) and triangular, are borne on stiff, upright stalks, and are abundantly produced from a creeping rhizome (prostrate stem) covered with light brown scales. They are furnished with pinnules (leafits) of a most peculiar shape, suggesting the parentage of *A. cuneatum*, for they are cuneate-trapezoid (wedge-shaped and having their four sides unequal), with their summit irregularly truncate (terminating abruptly) ; those near the ends of the pinnæ (leaflets) larger and with their margin divided into two lobes, the fertile ones cut into oblong, concave sinuses (depressions), a disposition which gives a bluntly cornute (horned) aspect to the principal pinnule. This singular variety, of particularly robust constitution and somewhat erect habit, possesses the property of reproducing itself true from spores.—*Nicholson, Dictionary of Gardening*, iv., p. 484.

A. C.-V. Moritzianum — Mor-itz-ĭ-a′-num (Moritz's), *Moore and Houlston.*

This exceedingly handsome variety, given by some authors as native of South America, and by others as coming from Madeira, appears to be the most gigantic form known of *A. Capillus-Veneris.* Whatever dimensions the fronds of that popular species may attain when grown under the influence of heat and moisture, they never bear comparison with those of this pendulous variety, which are perhaps not produced so abundantly as in the typical species or in some of the varieties above described, but which attain a length of 2ft. or even more, and are bi- or tri-pinnate (twice or three times divided to the midrib). They are furnished with large pinnules (leafits), rather distant, of a bright green colour, fan-shaped at their summit, and cuneate (wedge-shaped) at the base, and they are of an elegant and pendulous habit. —*Nicholson, Dictionary of Gardening*, i., p. 27.

A. C.-V. ramulosum—ra-mul-o′-sum (full of small branches), *Moore.*

In this extraordinary variety, native of Ireland, the main stem is twice or three times divided towards the summit of the frond, thus forming a spreading tuft of short, pinnate (once divided) branches. The pinnules (leafits) in the lower portion of the frond are narrow and depauperated (only partially developed).—*Lowe, Native Ferns*, ii., p. 419.

A. C.-V. rotundatum—rot-un-da′-tum (rounded), *Moore.*

A variety, native of the Isle of Man, differing essentially from the typical species in the shape of its pinnules (leafits), which are usually round at their summit and not wedge-shaped at their base like those of the normal form. The fronds themselves are narrow, although the pinnæ (leaflets) are more spreading. The upper portion of the fronds is nearly normal.—*Nicholson, Dictionary of Gardening*, i., p. 25. *Lowe, Native Ferns*, ii., p. 421.

A. C.-V. undulatum—un-dul-a′-tum (wavy), *Moore.*

This is a very elegant though somewhat delicate form, of dwarf habit; its dense fronds, which seldom exceed 6in. in length, are furnished with broad, roundish pinnules (leafits) of a peculiar dark green colour, and prettily undulated at the edges.—*Nicholson, Dictionary of Gardening*, i., p. 25.

A. cardiochlæna — car-dĭ-och-læ′-na (having heart-shaped indusia). A popular name, synonymous with *A. polyphyllum.*

A. caudatum—cau-da′-tum (tailed), *Linnæus.*

This evergreen, stove species, which in appearance is very different to the majority of Maidenhair Ferns, and which is exceedingly useful for growing in suspended baskets, is found wild nearly everywhere through the tropics, in China, Ceylon, Mauritius, the Malay Islands, Java, Madras, Cape Colony, on the banks of the Niger, in the Cape de Verde Islands, &c., and even on the Himalayas, where it has been collected up to 3000ft. elevation. The usual length of the fronds, which are simply pinnate (only once divided to the midrib), is from 1ft. to 1½ft., when they generally root at the extremity. They are provided on each side of the midrib with leaflets about ½in. long, dimidiate (fully developed on one side and scarcely at all on the other), nearly sessile (stalkless), with the lower line straight and horizontal, while the upper, rounded, one is more or less cut, the point generally blunt, the lower ones slightly stalked and wedge-shaped at the base. The leaflets are of a pale dull green or greyish colour, and, like the stalks, are covered with short, pale brown hairs, more abundant as they approach the crown whence the fronds start. In hanging baskets this plant makes a charming object, as it is not unusual to see from the same specimen three generations of plants, hanging down 3ft. or more. The roundish or transversely oblong sori (spore masses) are disposed on the edge of the lobes.—*Hooker, Species Filicum*, ii., p. 13. *Lowe, Ferns British and Exotic*, iii., t. 2A. *Nicholson, Dictionary of Gardening*, i., p. 25.

A. c. Edgeworthii—Edge-worth′-ĭ-i (Edgeworth's), *Hooker.*

This plant, which is also known in commerce as *A. ciliatum*, is likewise a native of China and the Himalayas. It differs from the species just described principally in the glabrous (smooth) nature of both surfaces of its pinnæ (leaflets). Its fronds are also slenderer, shorter, and produced in greater abundance, while the colour of their leaflets is also different and much more pleasing, being of a bright, soft bluish green. See Fig. 34 (for which we are indebted to Messrs. W. and J. Birkenhead).—*Hooker*, *Species Filicum*, ii., p. 14, t. 81B. *Beddome*, *Ferns of British India*, t. 17. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

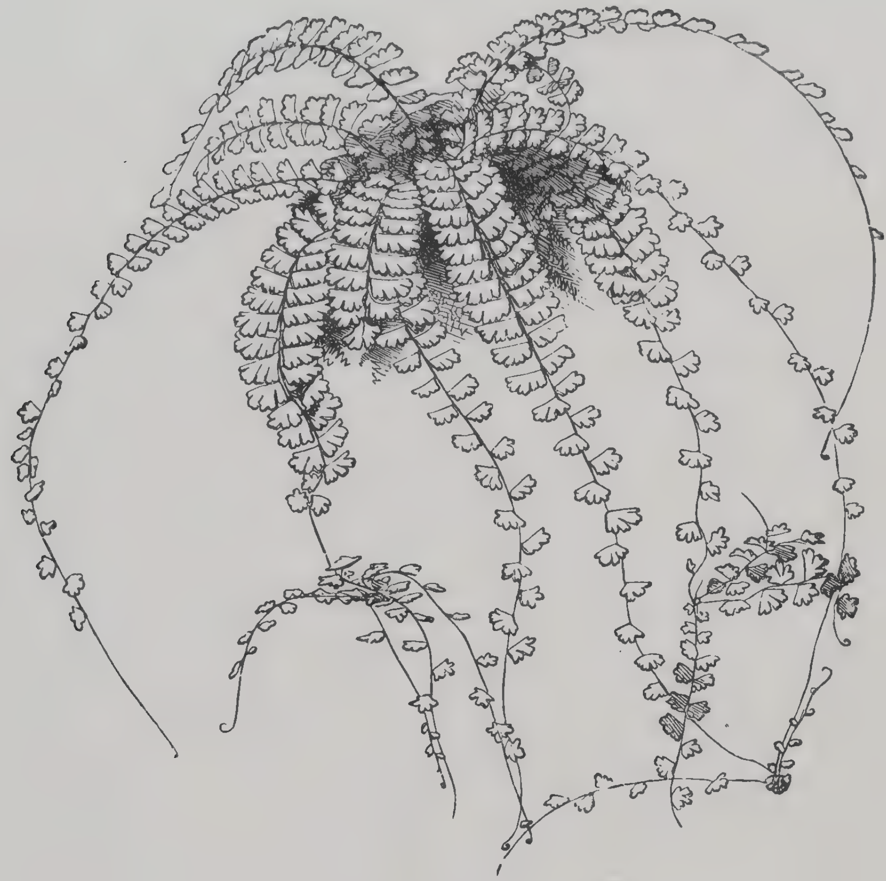


Fig. 34. Adiantum caudatum Edgeworthii

(¼ nat. size).

A. chilense — chil-en′-sĕ (native of Chili). A variety of *A. æthiopicum*.

A. Collisii — Col-lis′-ĭ-i (Collis'), *Moore*.

This highly-decorative, home-raised, stove Maidenhair, of fine proportions and graceful habit, was, when first described, given as a hybrid between *A. tenerum* and *A. gracillimum*, a theory which may be strengthened by the general appearance of the plant; for its massive fronds, which, like those of the first-named species, are triangular and from 1½ft. to 2ft. across, are also produced from a slowly-creeping rhizome (prostrate stem), but more numerous, somewhat taller, and much more branched, giving the plant a far more elegant contour; they are borne on black, shining, slender stipes (stalks) 1ft. to 1½ft. long, whence they become much branched and spread on all sides; whereas the numerous pinnules (leafits) with which they are furnished, besides being small, are also wedge-shaped and slightly toothed on the outer and the upper margins. The sori (spore masses), produced sparingly, are disposed one on each depression of the upper margin.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. colpodes—col-po′-des (hollowed), *Moore.*

This elegant species, native of Tropical America, is most useful for growing in suspended baskets or for planting in the wall of the stove Fernery, where its long, slender, and pendulous fronds can show themselves to advantage. These fronds are from 1ft. to 1½ft. long, 4in. to 8in. broad, tripinnate (three times divided to the midrib), and borne on slender stipes (stalks) covered with long but very narrow, light brown scales. The lower pinnæ (leaflets) spread at right angles from the stalk, and are about 4in. long by 1½in. broad, slightly branched below. The pinnules (leafits), with which the pinnæ are abundantly furnished, although of a very rich green when matured, are, when in a young state, of a very delicate pink colour: they are nearly or quite sessile (stalkless), about ½in. long and ¼in. broad, with their upper margin rounded, lobed, and toothed. The sori (spore masses) in this species are disposed on the teeth of the outer edge of the pinnules.—*Hooker, Synopsis Filicum*, p. 124. *Nicholson, Dictionary of Gardening*, i., p. 25.

A. concinnum—con-cin′-num (neat), *Hooker.*

A stove species of great beauty, native of Tropical America, from Mexico to the West Indies, southward to Peru and Brazil. On account of its decorative qualities, it is well worthy of a place in every collection. The fronds, which often reach 2ft. in length and measure about 8in. in their broadest part, are produced from a central, tufted crown and borne on stipes (stalks) 4in. to 8in. long, green when in a young state, but shining black when mature. They are tripinnate (three times divided to the midrib) and furnished with numerous spreading, flexuous pinnæ (leaflets bending in a zigzag manner), the lowest of which are frequently 6in. long by 3in. broad. The pinnules (leafits) are of thin texture and quite smooth, and are broadly wedge-shaped at the base, while their upper edge is irregularly rounded and has lobes blunt and mostly entire: the lowest segment of each pinna and pinnule is large and sessile (stalkless). The sori (spore masses) are kidney-shaped and disposed in distinct hollows all round the outer margin at the rate of eight or ten to each pinnule. The fronds—which are of about an equal width for two-thirds of their length, then gradually tapering to their extremity—being of a semi-transparent nature and the sori being numerous, the latter are shown to great advantage, especially when the plant is grown in a basket and suspended from the roof of a warm house. A distinctive character peculiar to this species lies in the disposition of the lowest pinnules, for these are upright and pressed flat against the stalk, which they cover almost on its entire length. See Plate.—*Hooker*, *Species Filicum*, ii., p. 42. *Nicholson*, *Dictionary of Gardening*, i., p. 25. *Lowe*, *Ferns British and Exotic*, iii., t. 1.

A. c. Flemingi—Flem-ing′-i (Fleming's), *Moore.*

A very grand variety, of garden origin. It is of a more upright habit and is not adapted for growing in hanging baskets; the fronds, which are shorter, but denser and produced in greater abundance than in the type, partake of the same light green colour, and have a very pleasing pinkish hue when young.—*Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. c. latum—la′-tum (broad), *Moore.*

This is a most valuable and distinct stove Adiantum, native of the East Indies, and recognised as being a form of *A. concinnum*, from which it essentially differs by its stiff, upright habit, and by the size of its pinnules (leafits), which are twice as large as those of that species and set much farther apart. See Fig. 35.—*Nicholson*, *Dictionary of Gardening*, ii., p. 25.

A. convolutum—con-vol-u′-tum (wrapped together), *Fournier.*

A stove species, of Mexican origin, having a very distinct appearance on account of the disposition of the pinnæ (leaflets) on longer stalks than those of most Adiantums. The fronds are quadripinnate (four times divided to the midrib), about 1ft. in length, and their long-stalked leaflets are of two different characters, the lowest ones being decompound (subdivided) and the upper ones lanceolate (spear-shaped) and simply pinnate (only once divided to the midrib). The terminal segment is cuneate-flabellate (wedge-shaped at the base and fan-shaped at the summit). The sori (spore masses), which are disposed two to four to a segment, distinguish this plant from all the other species of the group by their greater size, as they frequently measure two or two and a-half lines in breadth.—*Hooker*, *Synopsis Filicum*, p. 474.

A. cornubiense—cor-nu-bĭ-en′-sĕ (Cornish). This is merely a form of *A. Capillus-Veneris.*

A. crenatum—cre-na′-tum (bluntly toothed), *Willdenow*.

This handsome, stove species, native of Mexico and the West Indian Islands and popularly known under the appellation of *A. Wilesianum*, is very closely allied to *A. tetraphyllum*. The fronds are from 1½ft. to 2ft. high, quadripinnate (four times divided to the midrib), and furnished

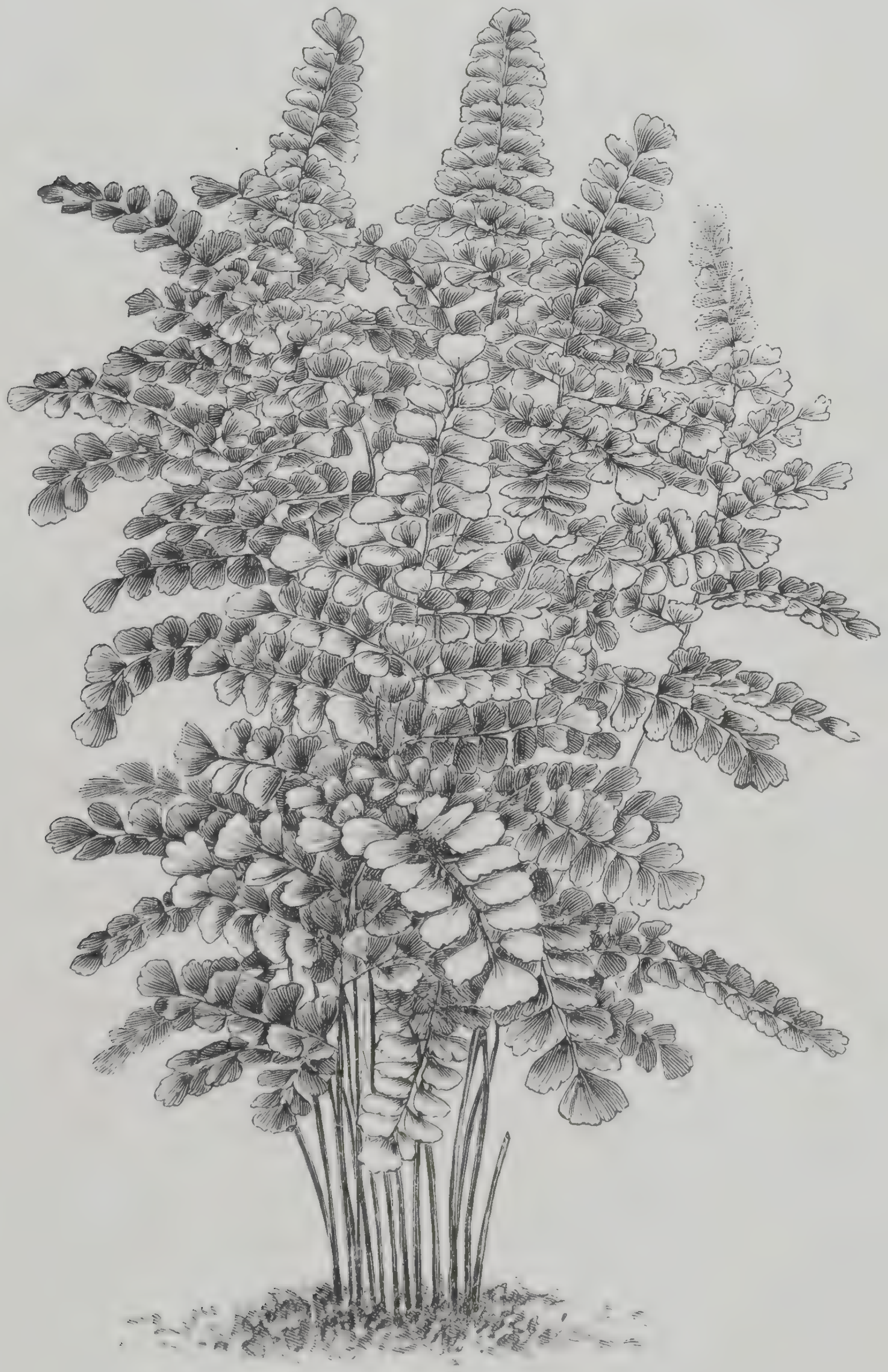


Fig. 35. Adiantum concinnum latum
(¼ nat. size).

with several large pinnæ (leaflets) on each side, the lowest of which are branched again, and with a terminal central pinna 6in. to 9in. long. These leaflets are again divided into numerous segments ½in. long by ¼in. broad, slightly crenate (indented) on their upper margin, and of a dark green colour. The fronds are borne on upright stipes (stalks) of a dark brown colour, shining and smooth, produced from an underground creeping stem; whereas the rachises (stalks of the leaflets) are slightly hairy. The sori (spore masses) in this species—about five, sometimes six, on each leafit—are roundish and situated in the sinus (depression) of the lobes, on the upper and sometimes the outer edge.—*Hooker*, *Synopsis Filicum*, p. 120. *Nicholson*, *Dictionary of Gardening*, i., p. 25. *Lowe*, *New and Rare Ferns*, t. 29.

A. crispulum—cris′-pul-um (slightly crisped). A form of *A. Capillus-Veneris.*

A. cristatum—cris-ta′-tum (crested), *Linnæus.*

A stove species, native of the West Indies, Venezuela, Cuba, Caracas, and most abundant in Jamaica. It is difficult to say how this plant came to receive such a specific name, as it has never been seen crested in cultivation: it is also known as *A. Kunzeanum.* The fronds are borne on strong, upright, somewhat woolly stipes (stalks) 6in. to 12in. long, are from 2ft. to 3ft. long, 9in. to 12in. broad, and furnished with a terminal central pinna (leaflet) fully 9in. long and 1½in. broad. Besides this there are numerous rather distant lateral ones on each side: these are lanceolate (spear-shaped), the lowest pair mostly bipartite (deeply divided or branched again). The pinnules (leafits) are ½in. to ¾in. long and ¼in. broad, horizontal and approximate (close together), somewhat falcate (sickle-shaped), and blunt at the point; they are of a very leathery texture, dark green, smooth, very shiny, and gradually become smaller as they approach the summit of the pinnæ. The semi-oval sori (spore masses) are generally confined to the superior margin, where they are disposed in several oblong patches.—*Hooker*, *Species Filicum*, ii., p. 46. *Nicholson*, *Dictionary of Gardening*, i., p. 25. *Lowe*, *Ferns British and Exotic*, iii., t. 22.

This species, which is seldom seen in perfection, requires less water at the roots than the majority of Adiantums. It is very partial to lime rubbish and should be grown in a somewhat dry part of the house.

A. cubense—cub-en′-sĕ (Cuban), *Hooker.*

This very distinct, stove species, native of Jamaica and Cuba, though not of much decorative value, is interesting on account of its fronds, about 10in. long, being simply pinnate (only once divided to the midrib) or with a single pair of short branches, and furnished with pinnæ (leaflets) of a deep green colour. The disposition of the sori (spore masses) is also peculiar, as these, not more than five or six in number, are placed in the centre of distinct hollows along the upper and outer edge.—*Hooker*, *Species Filicum*, ii., p. 8, t. 73A. *Nicholson*, *Dictionary of Gardening*, i., p. 25.

A. cultratum—cul-tra′-tum (knife-like). A variety of *A. trapeziforme.*

A. cuneatum—cun-ĕ-a′-tum (wedge-shaped), *Langsdorff and Fischer.*

This very old favourite, native of Brazil, is perhaps better known and more generally cultivated than any other Maidenhair Fern, probably because it is one of the most graceful and the most useful of all known species. Indeed, nothing can surpass the elegance of its foliage for bouquets; and this excellent quality is so fully appreciated by growers in general that hundreds of thousands of it pass through our flower markets every year, besides the enormous quantities grown in private places, where it is always in demand for the same purpose. The fact of its being evergreen, and consequently very useful in winter, greatly adds to its value. The fronds are from 1ft. to 1½ft. long, 6in. to 9in. broad, of a more or less upright habit, and borne on erect, slender stalks 6in. to 9in. long: they are triangular in shape, three or four times divided to the midrib, and furnished with numerous pinnules (leafits) ¼in. or a little more broad, cuneate (wedge-shaped) at the base, with their upper edge deeply lobed. The sori (spore masses), which are of moderate size and from four to six to each pinnule, are disposed all round the upper edge.—*Hooker*, *Species Filicum*, ii., p. 39. *Nicholson*, *Dictionary of Gardening*, i., p. 25. *Lowe*, *Ferns British and Exotic*, iii., t. 5.

A. cuneatum is of easy culture, requiring less attention than almost any other Fern, and thrives in almost any soil, although it prefers a compost of a rich, light nature. It is not very particular as to temperature, and, provided regular moisture at the roots be kept up, it will produce all through the year an immense quantity of its useful fronds from a tufted crown. It is so readily propagated from spores that wherever it is grown a stock of young plants is soon obtained: even without any special care being bestowed upon them they spring up in pots standing around.

This species has produced under cultivation more forms or variations (some call them monstrosities) which have received distinctive names than any other exotic Fern. Indeed, these have within the last ten years been brought out in such numbers that a very interesting collection may without much trouble be made of *A. cuneatum* varieties exclusively. But although most of them are very deserving of attention, we must confine ourselves to a selection of fourteen of the best and most distinct forms.

A. c. Bournei—Bour′-nĕ-i (Bourne's), *Moore.*

A variety with dense, triangular fronds, borne on long, black, shining stalks.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. c. deflexum—de-flex′-um (deflexed), *Moore.*

This very distinct form, of garden origin, with its triangular fronds, three or four times divided to the midrib, furnished with lobed and deflexed pinnules (segments), attracted the late Mr. Thomas Moore's attention to such an extent that in his description of this supposed hybrid in the "Gardeners' Chronicle" for 8th December, 1883, he says: "This goes far to support the ideas of those who believe in the crossing of Ferns, whether the process is truly described by the term hybridisation or not. It was raised between *A. cuneatum* and *A. Bausei*, the latter also a so-called hybrid Fern. The characteristics of the two sorts are unmistakably blended in the new form, which has the densely-fronded, stocky growth of *A. cuneatum*, with its spreading fronds and cuneate (wedge-shaped) pinnules (leafits or segments), with the singularly-deflexed pinnules of *A. Bausei*: this hanging position of the pinnules gives the plant a very distinct appearance. The plants are dense and compact in growth, on which account they are well adapted for grouping in small baskets and jardinettes. Their bright and cheerful green colour adds much to its value as a decorative Fern." To these remarks we may add that from personal observation we are convinced that this singular variety, like both its supposed parents, reproduces itself perfectly true from spores. See Plate (for which we are indebted to Messrs. J. Veitch and Sons). —*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. c. dissectum—dis-sec′-tum (dissected), *Moore.*

A very pretty variety, of garden origin, with fronds shorter and more triangular than those of *A. cuneatum*, and furnished with pinnules (leafits) more deeply cut than in that species. It is also of more compact habit, but does not reproduce itself true from spores, and can only be propagated by the division of the crowns.—*Nicholson, Dictionary of Gardening*, i., p. 26.

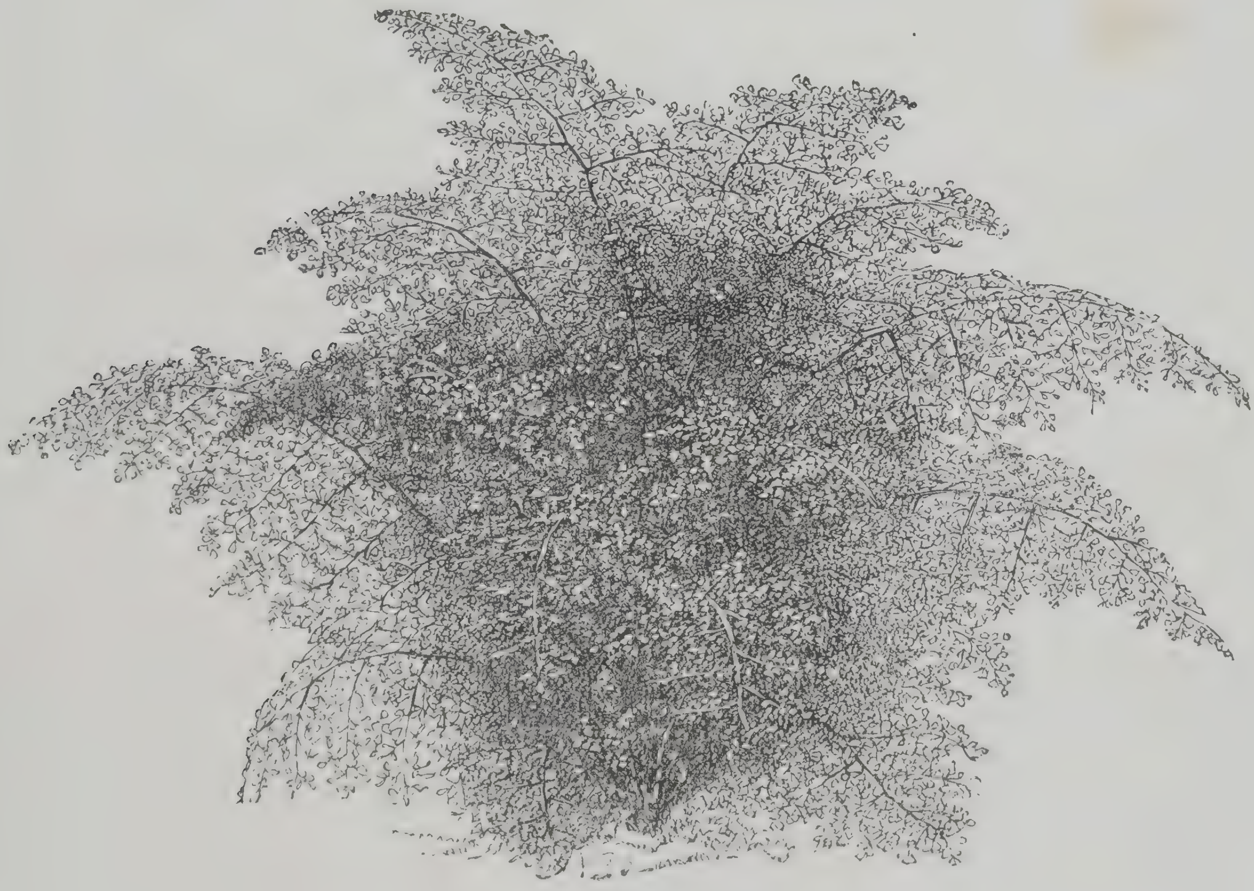


Fig. 36. Adiantum cuneatum gracillimum
(⅓ nat. size).

A. c. elegans—e′-leg-ans (elegant), *Moore.*

The fronds of this pretty variety, of garden origin, are of a particularly slender nature; they are triangular and about 9in. long, besides the glossy stalks, about 6in. long, on which they are borne, and are furnished with numerous cuneate (wedge-shaped) leafits of a very light green colour whose dimensions are intermediate between those of the typical species and those of the popular *A. c. gracillimum.* Its habit is more erect than that of the typical species; it is also of quicker growth and reproduces itself freely from spores.—*Nicholson, Dictionary of Gardening*, iv., p. 484.

A. c. gracillimum—grac-il′-lim-um (very slender), *Moore.*

This beautiful Fern, of garden origin, is one of the first really distinct variations observed in the popular *A. cuneatum*, and one which has very few rivals. The fronds—which, like those of the typical species, are produced in profusion from a densely-tufted crown and measure from 1½ft. to 2ft. in length and about 9in. across—are decompound (many times divided), thin and fragile in spite of their massive appearance, and furnished with minute pinnules (leafits) of a rich green, which are distinctly stalked and two- or three-lobed, the sterile lobes blunt. It is a most elegant Fern, with light and graceful fronds. The multiplicity of the minute pinnules and the almost invisible ramification of the rachis (stalk) give to a well-grown plant a particularly charming appearance. The sori (spore masses), slightly kidney-shaped, are solitary on the entire pinnules and two to three on the larger lobed ones. This variety reproduces itself true from spores, although the young seedlings do not show their characters until they have attained a certain size. See Fig. 36 (for which we are indebted to Mr. B. S. Williams). —*Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. c. grandiceps—gran′-dic-eps (large-headed), *Moore.*

One of the most distinct and by far the most attractive of the numerous home-raised forms of the popular species, from which it differs in several striking particulars. It is more robust in habit; its fronds, produced in great numbers from a densely-tufted crown, are more elongated and terminate in a dense tassel of finger-like growths; the pinnæ (leaflets) also terminate in similar, but smaller, branched tassels, which by their weight give the fronds a very elegant, arching habit, rendering the plant one of the most suitable Ferns for suspended baskets, in which position it thrives apace and soon makes a very handsome object. This highly decorative variety reproduces itself freely and true from spores. See Plate.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. c. Lawsonianum—Law-so-nĭ-a′-num (Lawson's), *Moore.*

This very abnormal form, of garden origin, is very distinct, inasmuch as its fronds—which, as in the typical species, are produced from a densely-tufted crown—are more rigid, yet not too much so to prevent its being a very elegant Fern. They frequently attain 1½ft. in height, and are abundantly furnished with curiously and finely cut pinnules (leafits) of a very dark green colour and of a peculiarly narrow wedge-shape; these, being set farther apart than in the species and borne on short, thread-like stalks, give the whole of the plant a very light and decorative appearance. This extremely curious form unfortunately does not reproduce itself true from spores, and consequently remains comparatively scarce.—*Nicholson, Dictionary of Gardening*, i., p. 26.

A. c. Legrandi—Leg-rand′-i (Legrand's), *Moore.*

A very curious and pretty form, of garden origin, having all the appearance of a natural hybrid between *A. c. gracillimum* and the equally popular *A. c. Pacottii*, which it resembles in habit, size, and mode of growth. Its densely though very minutely foliaged fronds seldom exceed 9in. in length, but the pinnules (leafits), with which they are most abundantly furnished, are as fine as, if not even finer than, those of *A. c. gracillimum*, and partake of the same colour, being in their young state of a lively rosy tint, when they form a pretty mass of bead-like pinkish foliage, producing a most striking and pleasing contrast with the more mature fronds, which are of the dark green colour peculiar to those of *A. cuneatum*. This very pretty form reproduces itself freely from spores.—*Nicholson, Dictionary of Gardening*, i., p. 27.

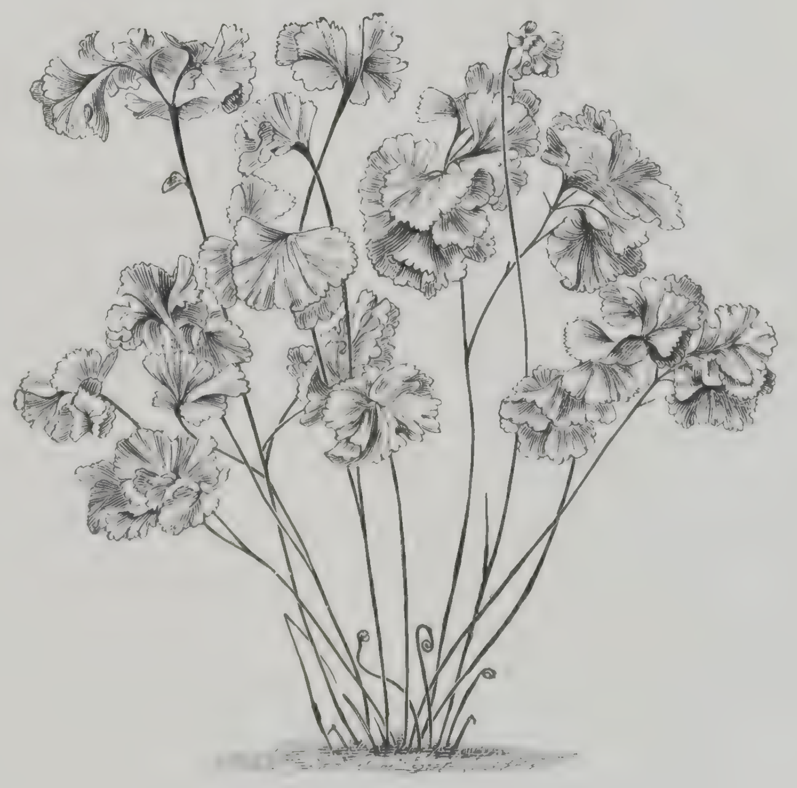


Fig. 37. Adiantum cuneatum Luddemannianum
(⅓ nat. size)

A. c. Luddemannianum—Lud-dem-an-nĭ-a′-num (Luddemann's), *Moore.*

This curious and very striking variety, of garden origin, is quite different from any other Maidenhair in cultivation. The peculiarity which distinguishes this Adiantum from all others consists in its pinnules (leafits) being crested, usually clustered at the extremities of the erect fronds, which are produced from a tufted crown and branch about a third of the way up. These pinnules, which are much curled and borne on short stalks, are generally fan-shaped and of a deep green colour. It is a very elegant variety, of small dimensions, rarely exceeding 10in. in height, and completely sterile. Its parentage as a hybrid would be difficult to trace, as it is the first crested form on record, a character which it cannot have inherited from any known source. See Fig. 37.—*Nicholson*, *Dictionary of Gardening*, i., p. 27.

A. c. mundulum—mun′-dul-um (neat), *Moore.*

This charmingly pretty and compact-growing variety, of garden origin, may reasonably be termed a perfect miniature and quite a gem among Adiantums. It forms a very elegant little subject, seldom more than 8in. high. Its fronds, which are produced in profusion from a densely-tufted crown, are tripinnate (three times divided to the midrib), triangular in shape, and furnished with numerous pinnules (leafits), which are narrowly wedge-shaped, a few of the larger ones among them being three-lobed. The sori (spore masses) in this case are roundish and disposed one in each notch of the lobes. The fronds are remarkably stiff, of good substance, and particularly well adapted for mixing with small flowers; while the plants themselves are of great value for edging in the Fernery. It is not generally known that this form reproduces itself true from spores. — *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. c. Pacottii—Pac-ot′-tĭ-i (Pacotto's), *Moore.*

This very peculiar garden variety, which is likely to prove one of the most useful of all Maidenhair Ferns grown, was, along with *A. c. mundulum* and several other intermediate forms, raised by a market grower of the name of Pacotto, at Montreuil, near Paris, from *one* batch of *A. cuneatum.* How all these variations occurred at one and the same time it is difficult to conceive and impossible to explain, there being no other Adiantum than the plain *A. cuneatum* grown on the place: the raiser had no pretensions to producing hybrids, and had no notion of the fertilisation of Ferns. The general appearance of the plant is that of *A. c. Legrandi*, so far as the production of the fronds from a thick crown is concerned; but these are furnished with pinnules (leafits) as large as those of a good-sized *A. cuneatum*, of the same peculiar deep green colour, and imbricated (overlapping each other) to such an extent as to warrant the significant popular appellation of "double Maidenhair," under which this variety is generally known. Like *A. c. mundulum*, it seldom grows more than 8in. high, and is useful for cutting and for edging in Ferneries; it also possesses the property of reproducing itself true from spores.—*Nicholson*, *Dictionary of Gardening*, i., p. 27.

A. c. schizophyllum—schiz-oph-yl′-lum (cut-leaved), *Moore*.

Although it is stated that this form appeared in a batch of seedlings of *A. æmulum*, there is little doubt that it is a variety of *A. cuneatum*. Its mode of growth, the production of its fronds from a densely-tufted crown, the shape of its segments, even their peculiar dark green colour, all seem to point to the origin of this plant, of very graceful habit and good constitution. Although dense and stocky in growth, all its parts are small and slender; its fronds, about 1ft. in length, are furnished with pinnules (leafits) in all cases small but commonly minute, the majority of them being cut into very narrow lobes. The branched character of the fronds is the chief peculiarity of this elegant variety: it causes an irregular development of the leaflets, which are occasionally placed at some distance apart. The sori (spore masses), of a crescent-shape, are situated in the notch at the summit of the pinnule; but they are sparingly produced in a perfect state, and the variety is usually increased by division of the crown.—*Nicholson*, *Dictionary of Gardening*, iv., p. 485.

A. c. strictum—stric′-tum (upright), *Moore*.

A garden variety, of little decorative value, but very interesting through the pinnæ (leaflets) with which its thrice-divided fronds are furnished being ascending and arranged somewhat spirally.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. c. versaillense—ver-sail-len′-sĕ (from Versailles), *Truffaut*.

This exceedingly pretty form, which in size as well as in habit is so equally intermediate between *A. c. grandiceps* and *A. c. Luddemannianum* as to suggest its being an offspring produced by the fertilisation of these two varieties, is undoubtedly one of the most interesting of all known garden hybrids. The cristation of its fronds, which seldom exceed 10in. in height, somewhat resembles that of the first-named of these varieties, although it is more uniform and much denser, but it is composed of pinnules (leafits) of the same shape and pleasing light green colour. The erect habit, however, the branching of the stipes (stalks) for about two-thirds of their length, and the circular disposition of the terminal crests, forcibly remind one of the latter-named variety, which until now has never been recorded as fertile even to the smallest degree. Its dense yet elegant habit renders *versaillense* valuable as a pot-plant, while for cutting purposes and decoration it may at once be classed among the most useful, its delicate yet substantial fronds being particularly well adapted for mounting with flowers. The propagation of this interesting variety is effected exclusively by the division of the crown, as it has until now, although apparently fertile, proved absolutely barren.—*B. S. Williams' New Plant Catalogue*, 1889.

A. Cunninghamii—Cun-ning-ham′-ĭ-i (Cunningham's). Synonymous with *A. affine.*

A. curvatum—cur-va′-tum (curved), *Kaulfuss.*

A beautiful and entirely distinct, stove species, native of Brazil, where it is principally found in the dry woods of Sierra de Santa Brida. Its handsome fronds, which rise from a short-creeping rhizome (prostrate stem), are borne on stipes (stalks) of a black, shining nature, 8in. to 12in. long, and are dichotomous (the main divisions being again once or twice forked). Their pinnæ (leaflets), 8in. to 12in. long and about 3in. broad, are furnished with pinnules (leafits) nearly 1½in. long, curved, imbricated (overlapping), with their superior margin and point finely toothed: these pinnules are of a light green colour and are attached to the midrib by a very short footstalk. The sori (spore masses) are oblong and disposed singly, about seven of them on a pinnule. This is a Fern which specially requires shade and a very moderate amount of moisture.—*Hooker, Species Filicum*, ii., p. 29, t. 84c. *Nicholson, Dictionary of Gardening*, i., p. 26. *Lowe, Ferns British and Exotic*, iii., t. 6.

A. c. brasiliense—bras-il-ĭ-en′-sĕ (Brazilian), *Raddi.*

This is a very distinct variety; it differs from the type principally through its more gigantic dimensions and the pubescent (downy) character of its fronds, which are produced from a stout and very slowly-creeping rhizome (underground stem) and frequently attain 3ft. in height. Their stipes (stalks) are hairy and brown, whereas their leaflets, of a dark green colour, are smooth, shorter, broader, blunter, and not so closely set as those of the species. The disposition of the sori (spore masses) in this variety is similar to that observed in the type.

A. cyclosorum—cy-clos-o′-rum (having circular spore masses), *Moore.*

This grand, well-marked, evergreen, stove species, from New Guinea, is very effective. Its fronds, which are borne on upright, stout, glossy-black stipes (stalks), 8in. to 12in. long, are triangular in shape, tripinnate (three times divided to the midrib), and furnished with spreading pinnæ (leaflets). They possess a very plumose (feathery) appearance through their pinnules (leafits), rhomboid (of four unequal sides) and about ½in. long, being borne on short stalks and set far apart. These pinnules are gracefully arched, and of a beautiful bronzy pink when in a young state, whereas when matured their colour is of a particularly pleasing light green. The sori (spore masses) in this species are circular and disposed eight to ten round the margin of each pinnule.—*Nicholson, Dictionary of Gardening,* iv., p. 484.

A. Daddsii—Dadd′-sĭ-i (Dadds'), *Moore.*

This supposed hybrid, of garden origin, which has all the appearance of being the produce of a natural cross between *A. cuneatum* and *A. Moorei* (*A. amabile* of commerce), is of gigantic growth and highly decorative. Its very elegant fronds, which by their pendulous habit resemble those of the latter-named species, are, like those of *A. cuneatum*, produced from a densely-tufted crown and borne on stipes (stalks) 10in. long, of a glossy and slender nature. Their leafy portion, fully 1½ft. long when fully developed, is deltoid (in form of the Greek delta, Δ), many times divided, and smooth. The pinnæ (leaflets) themselves are as large as a fair-sized whole frond of the common Maidenhair Fern, being fully 12in. long by 9in. across, and borne on stalks 3in. to 3½in. long. These pinnæ are furnished with pinnules (leafits) of a pale green colour, which, although numerous, are not crowded, for they are all distinctly borne on short, hair-like stalks and are of a peculiar rhomboid (unequally four-sided) and cuneate (wedge-shaped) form, quite intermediate between those of the two supposed parents. The intermediate sub-divisions are all more or less deeply lobed on the anterior or outer side, while the terminal ones are simply wedge-shaped, with two or three lobes at their summit, and the basal ones are roundish or oval and narrowed into the stalks. The kidney-shaped sori (spore masses), which are freely produced all over the fronds, are disposed one in each of the notches situated at the summit of the marginal lobes. Notwithstanding its apparently prolific character, this form has not been known to reproduce itself: its propagation is effected exclusively by the division of the crown.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. daphnites—daph-ni′-tes (glistening). A variety of *A. Capillus-Veneris.*

A. decorum—dec-o′-rum (decorous), *Moore.*

This popular name is the one under which this plant is, and has been for the last twenty years, most extensively known. It is, however, synonymous with *A. Wagneri.*

A. deflexum—de-flex′-um (deflexed). A variety of *A. cuneatum.*

A. deltoideum—del-toid′-ĕ-um (in form resembling the Greek delta, Δ), *Swartz.*

A very distinct, stove species, native of the West Indian Islands, differing from all other known species by the singular shape of its pinnæ (leaflets), which resemble an Ivy-leaf in miniature: without, however, having a clearly-defined central midrib. Its fronds, 4in. to 6in. long and about ¾in. broad, are borne on wiry, polished, upright, dark chestnut-brown stipes (stalks) 3in. to 4in. long. They are composed of a terminal lobe and numerous pairs of pinnæ that are distinctly stalked, hastate-deltoid (that is to say, between the shape of a halbert and that of a Greek Δ), and either heart-shaped or wedge-shaped at the base. The sori (spore masses) in this singular species are disposed in interrupted lines along the sides of the pinnæ, the rounded extremity of which they do not reach.—*Hooker*, *Species Filicum*, ii., p. 9.

A. depauperatum—de-pau-per-a′-tum (poor). This is a variety of our native *A. Capillus-Veneris.*

A. diaphanum—dĭ-aph′-an-um (transparent), *Blume.*

This lovely species, of dwarf dimensions, which thrives equally well under either greenhouse or stove treatment, being a native of Java, Fiji, New Caledonia, Norfolk Island, New South Wales, and New Zealand alike, is much better known and extensively grown under the name of *A. setulosum.* In general habit it shows a tendency towards the pedate (foot-shaped) group, for its fronds, which seldom attain more than 10in. in height, are simply pinnate (once divided to the midrib) or provided with one to three branches at the base. These leaflets or branches are furnished with pinnules (leafits) of a thin texture, ½in. long and ¼in. broad, the lower line rather decurved (bent round), the upper line nearly parallel with it, crenate (notched), like the blunt outer edge. The sori (spore masses) are numerous, kidney-shaped, and disposed singly, five to seven on each pinnule. See Fig. 38.—*Hooker, Species Filicum,* ii., p. 11, t. 80c. *Nicholson, Dictionary of Gardening,* i., p. 26.

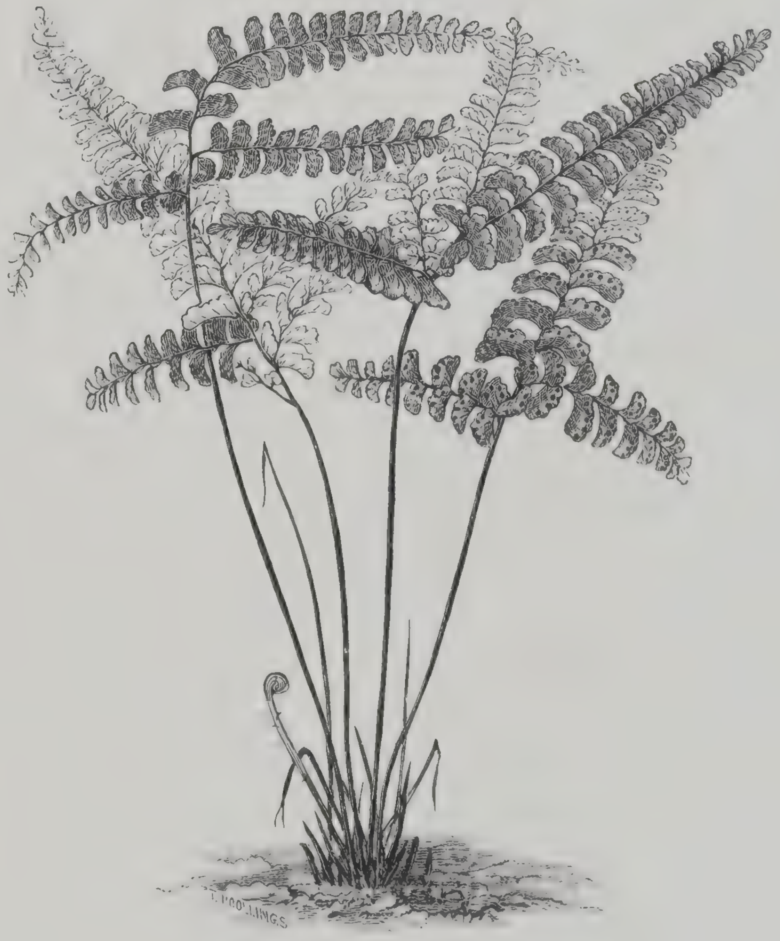


Fig. 38. Adiantum diaphanum
(⅓ nat. size).

This pretty little species is of easy culture and very useful for cutting, its bright green fronds lasting a long time when severed from the plant. It is also of great value as an edging Fern for the conservatory, for not only are the fronds produced in abundance, but the slender rhizomes (underground stems) possess the peculiarity of forming young plants on all their parts, thus making compact little specimens of great interest and utility.

A. digitatum—dig-it-a′-tum (finger-leaved), *Presl.*

This distinct and robust-growing, stove species, native of New Granada and Peru, is usually cultivated under the name of *A. speciosum.* In general appearance it reminds one but very little of a Maidenhair Fern, as it is of semi-scandent (half-climbing) habit, and its large fronds, which are tripinnate (three times divided to the midrib) and of a soft, fleshy texture, are of a deciduous nature; they are borne on thick, fleshy stipes (stalks) of a pale green colour, woolly and transparent, from 1ft. to 1½ft. long; their foliaged portion, which frequently attains 3ft. in length and 20in. in width at the lower part, gradually shortens upwards. The pinnules (leafits) vary in shape from deflexed (bent back) to cuneate (wedge-shaped) at the base; they are very symmetrically set, borne on short stalks, often measure 1¼in. across, have their upper edge rounded and deeply cut, and are densely covered with short hairs, which give the foliage a woolly feeling when touched. The sori (spore masses) are disposed in lines along the edge of the lobes. This is a very distinct and ornamental Fern, as will be seen from the Plate (for which we are indebted to Messrs. Veitch and Sons).—*Hooker*, *Species Filicum*, ii., pp. 39 and 45, t. 85c. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. dissectum—dis-sec′-tum (cut up). A variety of *A. cuneatum.*

A. dolabriforme—dol-a′-brif-or′-mĕ (axe-shaped). An evergreen form of the deciduous *A. lunulatum.*

A. (Hewardia) dolosum—Hew-ar′-dĭ-a; dol-o′-sum (deceiving), *Kunze.*

This stove species, native of Jamaica, Granada, and Brazil, is better known perhaps under the names of *A. Wilsoni* of Hooker and *A. macropterum* of Miguel: it belongs to the small group which comprises the only plants of the genus having anastomosing (intermixed) veins, but in general aspect it much resembles *A. lucidum.* Its fronds, 9in. to 12in. long and 6in. to 12in. broad, of a dark green colour above, paler below, are borne on upright stipes (stalks) 6in. to 12in. long, adherent to a creeping rhizome (prostrate stem). They are simply pinnate (only once divided to the midrib) and formed of a large terminal pinna (leaflet) and from two to six lateral ones on each side; these are of a sub-coriaceous (almost leathery)

texture and sub-sessile (almost stalkless), 4in. to 6in. long, 1in. to 2in. broad, egg-shaped and nearly entire (undivided). The sori (spore masses) are continuous on both margins nearly to the extremity. This singular species requires a porous, stony soil.—*Hooker*, *Species Filicum*, ii., p. 6, t. 79B. *Nicholson*, *Dictionary of Gardening*, i., p. 29. *Lowe*, *Ferns British and Exotic*, iii., t. 16.

A. Edgeworthii—Edge-worth′-ĭ-i (Edgeworth's). A variety of *A. caudatum.*

A. elegans—e′-leg-ans (elegant). A form of *A. cuneatum.*

A. emarginatum—e-mar-gin-a′-tum (notched at the end), *Hooker*, *not of Bory.* A North American form of *A. æthiopicum.*

A. excisum—ex-ci′-sum (bluntly cut), *Kunze.*

This pretty, greenhouse species, native of Chili, though of smaller growth and of slenderer habit, is closely allied to *A. æthiopicum*, and like that species has also produced several distinct varieties. In the typical form the fronds, 6in. to 12in. long and 3in. to 4in. broad, are borne on stalks 2in. to 3in. long, of a wiry nature and chestnut-brown colour, rising from a tufted crown. They are furnished on each side with numerous flexuose (zigzag), short leaflets, the lowest of which are slightly branched again ; their pinnules (leafits) are about three lines broad, wedge-shaped at the base, while their upper edge is rounded and bluntly lobed. The sori (spore masses) are large for the size of the plant, reniform (kidney-shaped), and situated in distinct hollows on the lobes.—*Hooker*, *Species Filicum*, ii., p. 41. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. e. Leyi—Ley′-i (Ley's), *Moore.*

In this variety, of garden origin, the fronds, seldom more than 4in. long, are very densely crested.—*Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. e. multifidum—mul-tif′-id-um (much cut), *Moore.*

This handsome, garden variety partakes somewhat of the character of *A. concinnum*, both as regards the way in which its fronds are produced and by the peculiar manner in which their stalk is covered by deeply-cut pinnules (leafits) closely pressed against it. The fronds, of a drooping habit, are quadripinnate (four times divided to the midrib), and their deeply-cut sub-divisions give the plant a very graceful appearance: these fronds grow from 1ft. to 1½ft. in length, and are usually divided at their summit into several branches, which very often are again divided, forming a beautiful tassel 2in. to 3in. long.—*Nicholson, Dictionary of Gardening*, i., p. 26.

A. e. nanum—na′-num (dwarf), *Moore.*

This variety, also of garden origin, is very useful where dwarf Ferns are required for edging or for pot culture, or where small fronds for mixing with flowers are in demand. Its rigid fronds, which are produced in great abundance from a densely-tufted crown, are tripinnate (three times divided to the midrib), and furnished with wedge-shaped and closely-set pinnules (leafits): they seldom attain more than 8in. in height.

A. falcatum—fal-ca′-tum (sickle-shaped). A synonym of *A. villosum.*

A. Farleyense—Far-ley-en′-sĕ (from Farley), *Moore.*

This truly magnificent Adiantum, native of Farley Hill, Barbados, by far the most beautiful of the whole genus, and not inappropriately called the "Queen of Maidenhair Ferns," has attained such a degree of popularity and is so extensively known under the above name that, although classed in the "Synopsis Filicum" and other botanical works as simply a form of *A. tenerum*, it has been thought advisable to retain here the popular appellation. It is too well known to require an elaborate description, which, however good and complete, would most likely fail to do it full justice. It has been given at different times as a natural sport or accidental seedling of *A. Ghiesbreghtii* (*A. scutum* of commerce), or as a plumose (feathery) form of *A. tenerum.* Be it what it may, this evergreen Fern is nevertheless unrivalled for exhibition purposes: it always attracts a deal of attention and shows the gardener's skill to great advantage, with its broad, massive, yet gracefully-drooping fronds, quadripinnate (four times divided to the midrib), from 2½ft. to 3ft. in length and frequently 2ft. broad. When grown near the glass and under the influence of abundant light, the pinnules (leafits), often 1½in. broad, deeply fringed, and with almost crispy lobes (Fig. 39), are very prettily edged with a delicate pale crimson tint, which turns to a pleasing rich light green colour when quite mature.—*Hooker, Synopsis Filicum*, p. 124. *Nicholson, Dictionary of Gardening*, i., p. 26.

Some growers consider *A. Farleyense* difficult to manage, but the difficulty is more imaginary than real. Heat and moisture are the essential requirements of this plant, and it will not succeed where these, or either of these, are deficient, though it may be safely wintered in a house with a temperature of 60deg., occasionally falling to 55deg. In structures where this minimum temperature cannot be maintained in winter, the plants do not die off altogether, but they suffer so severely that several months of careful nursing are required to restore them to their former strength. As regards soil, this Adiantum is not so difficult to please as is supposed, for we have seen equally good specimens grown in materials of totally different nature. Two parts of good fibrous peat and one of fibry-loam and coarse silver sand together form a compost in which it will succeed; but plants in no way inferior have been grown entirely in pure, light fibrous loam, commonly

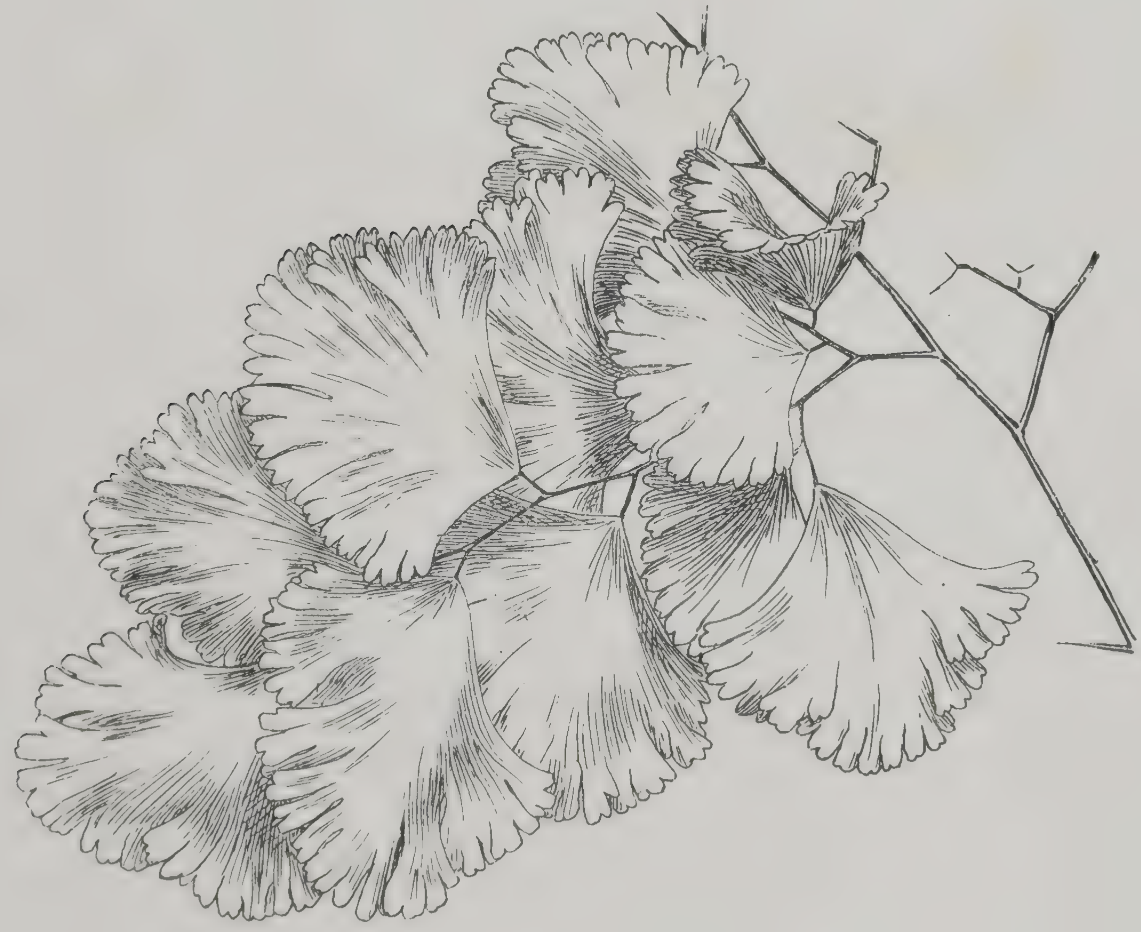


Fig. 39. Portion of Frond of Adiantum Farleyense
(nearly nat size)

known as "yellow loam." On the Continent, where such loam as that which is used in this country is not procurable, plants of this noble Fern, in every respect equal to ours, may be seen in sandy peat or in partly-decayed leaf-mould.

Though various statements have appeared with reference to spores being produced by *A. Farleyense*, we have never had the good fortune to detect any, although we have many times had the opportunity of examining the mock sori (spore masses) produced by the revolute (bent back) part of the pinnules, which had all the appearance of being fertile. Consequently, the division of the crowns is the only means by which this handsome Fern can be increased.

A. Féei—Fe′-ĕ-i (Fée's), *Moore*.

This greenhouse species, which is also known as *A. flexuosum*, is a native of Mexico and Guatemala, and is entirely different from any other Adiantum known in cultivation. It is the only one that is really of a semi-scandent (half-climbing) habit. Its singular fronds, which in this country attain 2½ft. in length and 1ft. or more in breadth, are borne on stipes (stalks) 1ft. to 1½ft. long, of a most peculiar climbing nature and rising from a central crown. They are tripinnate (three times divided to the midrib), while their main and secondary rachises (stems) are bent in a flexuose or zigzag manner, with all their branches or sub-divisions firm, standing at right angles, and densely covered with ferruginous (rusty), short hairs. The leaflets of which the fronds are composed vary in length according to the position they occupy: thus the lower ones are from 6in. to 9in. long and 3in. to 4in. broad, whereas the others grow gradually shorter as they are situated more towards the summit of the frond. They are distant (set far apart) and furnished with pinnules (leafits) of a sub-coriaceous (almost leathery) texture, 1in. to 2in. long and fully ½in. broad, consisting of a terminal segment and several lateral ones, all of which are set far apart, borne on short stalks, and of a peculiar half-round and wedge-shaped form. The sori (spore masses) in this very curious species are roundish and disposed along the margin of the pinnules, where they form an edging more than half a line deep.—*Hooker*, *Synopsis Filicum*, p. 125. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. Fergusoni—Fer-gus-o′-ni (Ferguson's), *Baker*.

An elegant, stove species, native of Ceylon, with fronds stiffly erect, 2ft. to 2½ft. high, including the glossy purplish-black stalks. They are tripinnate (three times divided to the midrib) and furnished with long-stalked leaflets, which in their turn are subdivided into large, overlapping pinnules (leafits), variable in form, but where sterile neatly toothed and

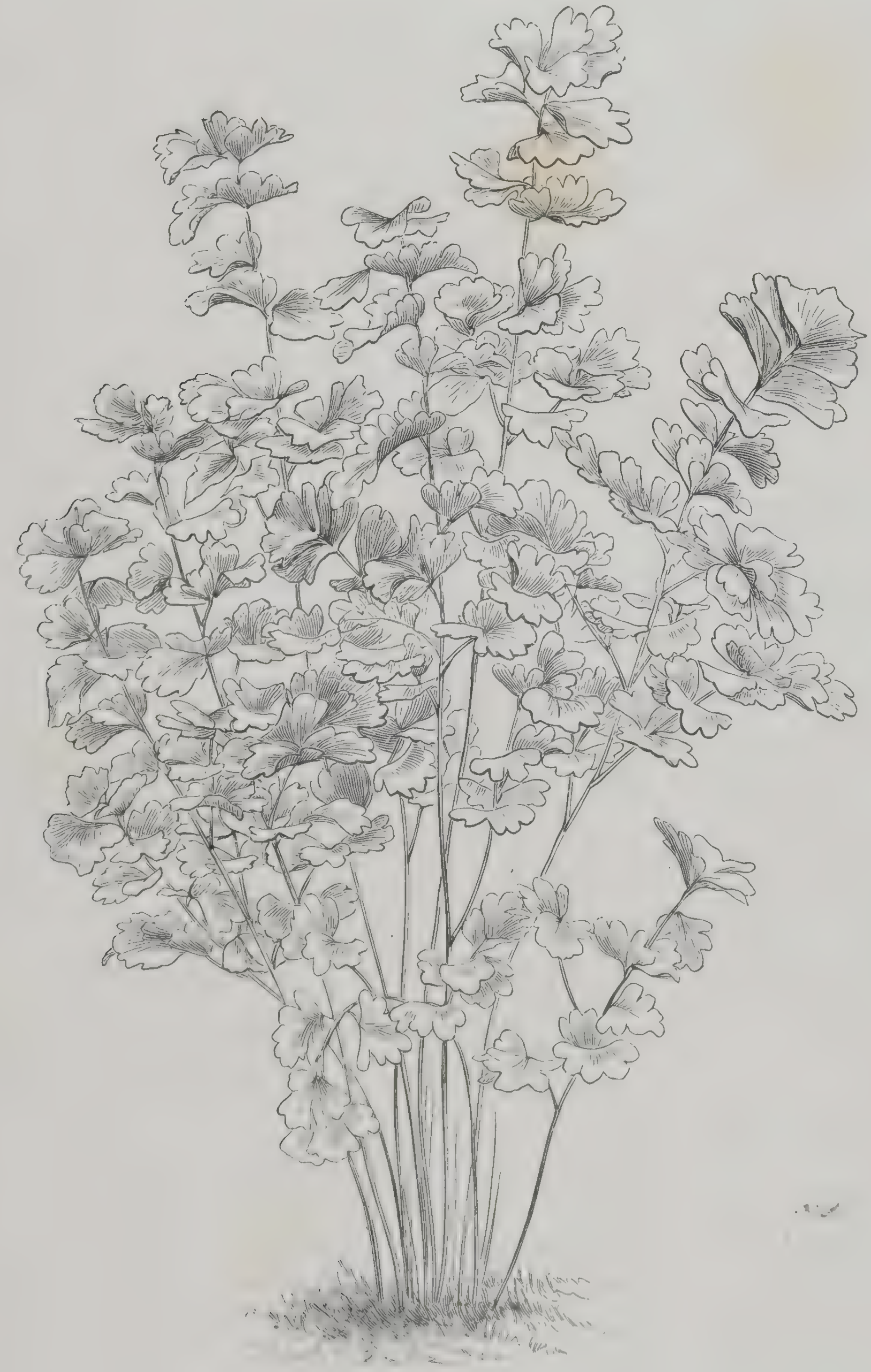


Fig. 40. Adiantum Fergusoni
(¼ nat. size).

notched along the outer margin: the terminal one is generally three-lobed (Fig. 40). On account of the light colour of its foliage, the aspect of this Fern is particularly pleasing. The sori (spore masses), of oblong form, are situated at the top of the lobes of the pinnules.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. festum—fes′-tum (pleasant), *Moore*.

A supposed garden hybrid, requiring greenhouse treatment. Its fronds, borne on stalks 8in. to 9in. long and of a purplish-ebeneous colour, are produced from a densely-tufted crown. They are about 1ft. long, triangular in shape, decompound (many times divided), of a drooping habit, and having pinnules (leafits) that are small, crowded, cuneate (wedge-shaped), and larger towards their extremities; the terminal ones are either symmetrically or unequally cuneate and bipartite (deeply divided into two parts), the others being lobed on their anterior or outward edge. The kidney-shaped sori (spore masses) are disposed in a sinus (notch) of the lobe.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. fissum—fis′-sum (deeply cut). A variety of *A. Capillus-Veneris*.

A. flabellulatum—fla-bel-lul-a′-tum (small fan-leaved), *Linnæus*.

A stove species, of medium dimensions, native of Hindostan from the Himalayas to Ceylon, also of Japan, South China, and the Malay Islands. It is also known as *A. amœnum*. Its peculiar fronds, borne on strong, upright stipes (stalks), are dichotomously branched (divided into two parts, which are in their turn divided into two again) and furnished with a central pinna (leaflet) 4in. to 8in. long and ¾in. broad. The pinnules (leafits), about ¼in. broad and deep, are dimidiate (fully developed on one side of the midrib and scarcely at all on the other); their lower edge is nearly straight, the upper one rounded, the outer one blunt, both entire or only slightly notched. The sori (spore masses) are disposed in several oblong patches round the upper and outer edge.—*Hooker*, *Species Filicum*, ii., p. 30. *Nicholson*, *Dictionary of Gardening*, i., p. 26. *Beddome*, *Ferns of Southern India*, t. 218.

A. flexuosum—flex-ŭ-o′-sum (zigzag). Synonymous with *A. Féei*.

A. Footi—Foot′-i (Foot's). A variety of *A. Capillus-Veneris*.

A. formosum—for-mo′-sum (beautiful), *R. Brown.*

This very handsome, strong-growing, greenhouse species, which under proper cultivation attains very large dimensions, is one of the most ornamental Ferns in existence, and is on that account grown in immense quantities. It is a native of Australia, being very common in the neighbourhood of Port Jackson, but is never found wild elsewhere, with the solitary exception of Mangatainoka, New Zealand, where it was discovered by Mr. Colenso. Its fronds, which are produced abundantly from slender, underground, creeping rhizomes (prostrate stems), are branching and quadripinnate (four times divided to the midrib). They are erect or nearly so, and from 1½ft. to 3ft. in height, one-half of which, the stipes (stalk), is naked. The foliaged part, triangular in outline, is copiously furnished with small pinnules (leafits), whose lower edge is straight, whereas the upper and outer are rather rounded and deeply lobed, the lower ones being distinctly stalked (Fig. 41). These

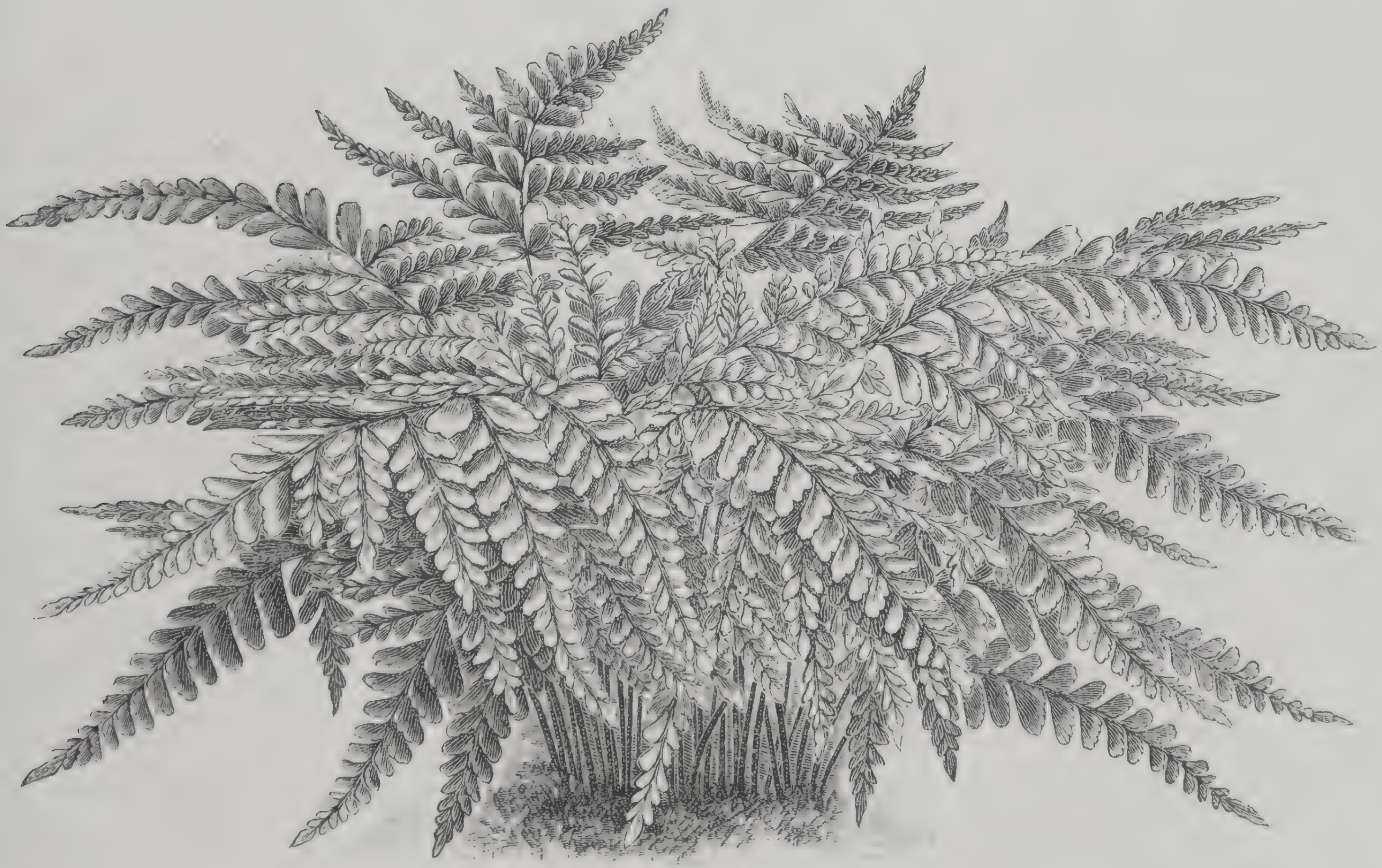


Fig. 41. Adiantum formosum
(much reduced).

sub-divisions are pale green, the barren ones being finely dented. The spore masses, nearly kidney-shaped, are usually disposed six to eight to each fertile pinnule.—*Hooker*, *Species Filicum*, ii., p. 51, t. 86B. *Nicholson*, *Dictionary of Gardening*, i., p. 26. *Lowe*, *Ferns British and Exotic*, iii., t. 11.

This species is of very easy culture, and succeeds admirably in a greenhouse; yet, when cultivated in stove heat, the sub-divisions of the fronds become larger, and the plant forms in all respects a handsomer specimen. It is very readily propagated by spores, and also by the division of the creeping rhizome. No particular care is required with regard to its propagation, as one is almost certain to find seedlings of it coming up amongst the different plants in the house in which it is cultivated.

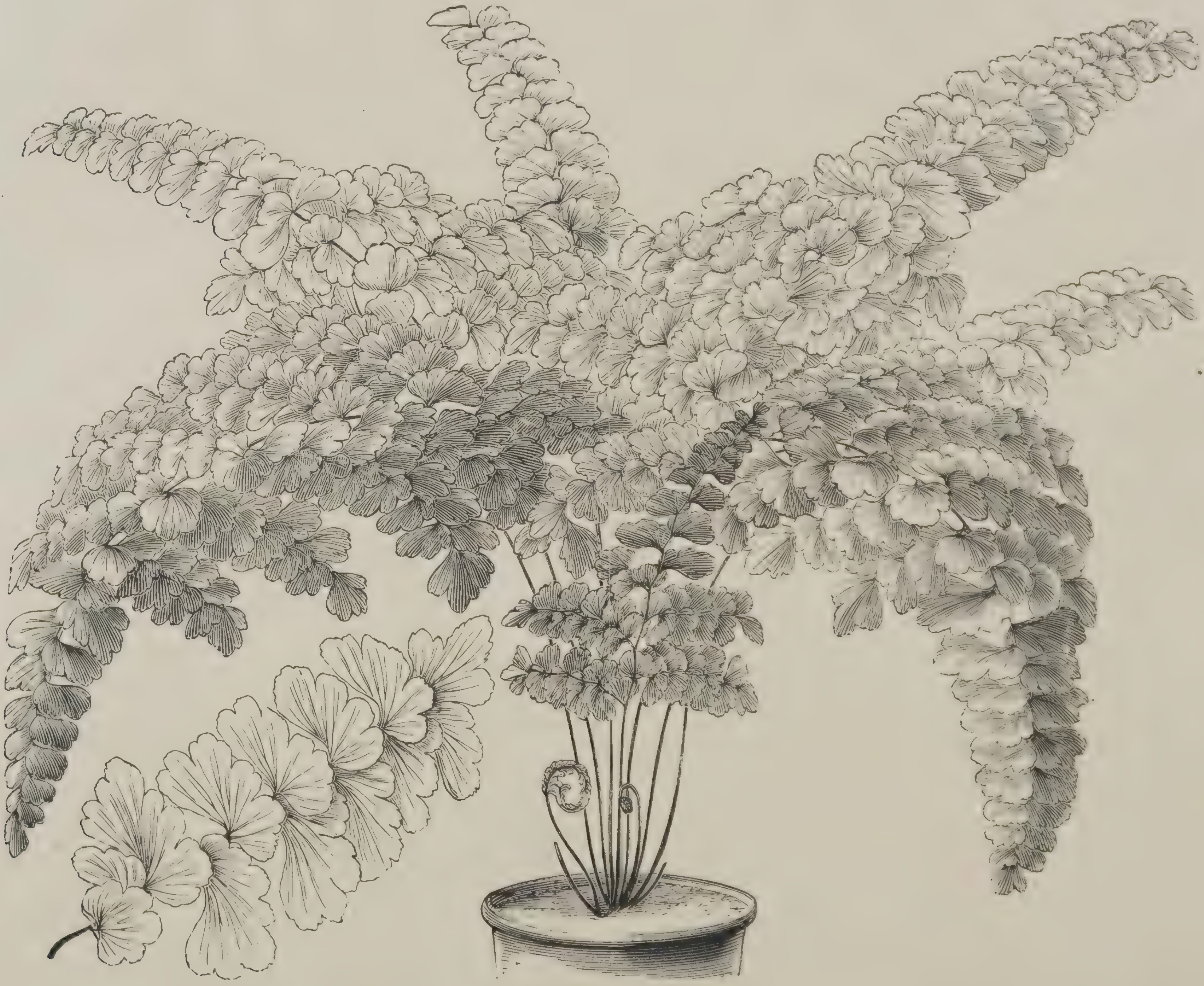
A. fovearum—fov-ĕ-a′-rum (pitted). Synonymous with *A. intermedium.*

A. fragile—frag′-il-ĕ (fragile), *Swartz.*

A species of dwarf habit, native of the West Indian Islands. Its fronds are 6in. to 12in. long and 3in. to 6in. broad; they bear numerous pinnæ (leaflets), the lowest of which are branched again. The pinnules (leafits), which are articulated (jointed) at the base, much resemble those of the common *A. cuneatum*, being cuneate (wedge-shaped), but they are smaller and less deeply lobed. These pinnules are of such a deciduous nature that they have entirely fallen from nearly all the specimens in the Hookerian Herbarium, so that nothing remains but a dense tuft of rigid stems, with numerous slender, glossy branches. The sori (spore masses), nearly kidney-shaped in this species, are placed in distinct hollows in the lobes of the upper edge.—*Hooker*, *Species Filicum*, ii., p. 41.

A. fragrantissimum—fra-gran-tis′-sim-um (very sweet-scented), *Henderson.*

This handsome Fern is quite distinct from anything previously known in cultivation. It is of garden origin, and is possibly a natural hybrid from *A. cuneatum* and *A. Moorei* (*A. amabile* of commerce). Its fronds, which last much longer than those of any other Adiantum with wedge-shaped pinnules (leafits), are produced from a central tufted crown and are borne on glossy and somewhat upright stalks 5in. to 6in. long; the leafy portion of the fronds is from 1ft. to 1¼ft. long by about 1ft. broad at the base: they are quadripinnate (four times divided to the midrib), furnished



Adiantum Henslovianum (sessilifolium), showing Habit and detached Pinna

(Habit, ¼ nat. size; Pinna, nat. size).

with spreading leaflets, the basal ones of which are borne on long stalks. The characteristic feature of this variety is the large size of the ultimate divisions, which at once appears peculiar, presenting as it does a novel aspect among the forms with wedge-shaped pinnules. The terminal ones are the longest, measuring eight lines in length and five or six lines across their broadest part; while the lateral ones are seven lines long and three lines broad, with an elongated, wedge-shaped base, and are lobed at their summit. The sori (spore masses), of a roundish kidney-shape, are disposed in a sinus (depression) at the summit of the lobes. Although fully described by Mr. Moore in the "Gardeners' Chronicle," he disclaims all participation in the naming of this Fern. Messrs. E. G. Henderson and Sons gave the name to the plant, and distributed it under that name, for which there appears to be no reason, as the fronds, whether in a fresh or in a dry state, are scentless.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. fulvum—ful′-vum (tawny), *Raoul.*

This pretty and very compact-growing, greenhouse species, native of New Zealand, Norfolk Island, New South Wales, and Fiji, is of great value as a pot-plant, also where Ferns are required for edging, as its habit is very symmetrical. Its elegant fronds, borne on stiff yet slender stalks of a scabrous (rough) nature and produced from a central tufted crown in great abundance, are from 8in. to 12in. long and 6in. to 8in. broad; they are formed of a terminal pinna (leaflet) 4in. to 6in. long and about 1½in. broad, and of several branches, the lower of which are branched again and furnished with pinnules (leafits) of a chartaceous (parchment-like) texture, about ¾in. long and ¼in. broad, dimidiate (fully developed on one side of the midrib and scarcely at all on the other), the lower edge nearly straight, the upper almost parallel, sharply toothed like the outer edge, of a bright bronzy or metallic hue when in a young state and dark green when fully developed. The sori (spore masses) are large and numerous, roundish, almost heart-shaped, and disposed from eight to twelve round a pinnule.—*Hooker*, *Species Filicum*, ii., p. 52, t. 85A. *Nicholson*, *Dictionary of Gardening*, i., p. 26. *Lowe*, *Ferns British and Exotic*, iii., t. 19.

A. Funkii—Funk′-ĭ-i (Funk's). A variety of *A. trapeziforme.*

A. Galeottianum—Gal-ĕ-ot-tĭ-a′-num (Galeotti's), *Hooker.*

This very distinct, Mexican, stove species, of medium dimensions, native of the province of Oaxcaca, where it is found at an elevation of 3000ft., is easily recognised by its large, sub-orbicular (nearly round), equal-sided pinnæ (leaflets). These organs, of a coriaceous (leathery) texture, nearly entire, and borne on short footstalks, are disposed in opposite pairs along the fronds, which are simply pinnate (only once divided to the midrib), but occasionally branched at the base. The stipes (stalks) on which these fronds are borne are erect, of a wiry nature, dark chestnut-brown in colour, and polished, measuring from 3in. to 4in. in length. The venation in this species is very clearly marked on the under-side of the frond, but it is quite flabellate (fan-shaped), every vein being forked and forked again, and there is no central rib stronger than the others. The reniform (kidney-shaped) sori (spore masses), about one line across, are disposed in shallow sinuses (depressions) all round the edge of the fertile pinnæ.—*Hooker*, *Species Filicum*, ii., p. 10, t. 80B.

A. Ghiesbreghtii—Ghies-breght′-ĭ-i (Ghiesbreght's), *Moore.*

This very handsome, stove plant, which is much more extensively known under the name of *A. scutum*, originated in Mr. B. S. Williams's nursery, where it sprang up without anyone being able to say whence it came, or if it were merely an altered and improved form—a sport—of some species already in cultivation. Anyhow, it possesses the power of reproducing itself true from spores, as may be seen by the immense quantities of it which yearly find their way into our flower markets. It is a very fine Fern, of remarkably good constitution, with the habit of *A. Farleyense*, but less dense, and undoubtedly a variety of *A. tenerum:* it also makes one of the finest known Maidenhairs for decoration or for exhibition purposes. Its beautiful fronds, which are produced from a short-creeping, underground rhizome (prostrate stem), are from 1½ft. to 2½ft. long and fully 1½ft. broad at the base: they are tripinnate (three times divided to the midrib), furnished with numerous pinnules (leafits) that are large, slightly crenate (dented) on the margins, and of a bright green colour. The sori (spore masses), of oblong shape, are interrupted or disposed singly six or eight round each fertile pinnule.—*Nicholson, Dictionary of Gardening*, i., p. 26.

A. glaucescens—glau-ces′-cens (somewhat greyish), *Klotzsch.*

A stove species, native of Ecuador, Guiana, and North Brazil. Its fronds, borne on slender, upright, polished stalks 6in. to 9in. long, are about 1ft. each way; they are formed of a terminal pinna (leaflet) and of several loosely-spreading ones on each side, which are furnished with numerous pinnules (leafits) of a thin, papery texture and about 1in. long by ¼in. broad. Their lower border is nearly straight, the upper one nearly parallel with it; their outer margin is bluntly rounded, and the lowest of these pinnules are borne on short stalks. The sori (spore masses) are disposed in numerous patches a line and a-half broad, with a space between them, and are situated round the upper and outer edge.—*Hooker*, *Species Filicum*, ii., p. 26.

A. glaucophyllum—glau-coph-yl′-lum (grey-fronded), *Hooker.*

This greenhouse species, of dwarf habit, and known in gardens as *A. andicolum* and *A. mexicanum*, is closely allied to *A. cuneatum*, and is a native of Mexico and Guatemala. Its pretty little, upright fronds, which are abundantly produced from a slender rhizome (prostrate stem), are seldom more than 1ft. long and 9in. to 12in. broad, quadripinnate (four times divided to the midrib), and furnished with numerous segments ¼in. broad, deep green above and glaucous (greyish) beneath, wedge-shaped at the base, their upper edge irregularly rounded and more or less lobed. The reniform (kidney-shaped) sori (spore masses) are disposed in distinct hollows in the summit of the upper edge.—*Hooker*, *Species Filicum*, ii., p. 40. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. gracillimum—grac-il′-lim-um (very slender). A variety of *A. cuneatum.*

A. grande—gran′-dĕ (large). A variety of *A. Capillus-Veneris.*

A. grandiceps — gran′-dic-eps (large-headed). A crested variety of *A. cuneatum.*

A. grossum—gros′-sum (large), *Mettenius.*

In this stove species, native of the Andes of Granada, the fronds, borne on black, glossy stalks 8in. to 12in. long, are lanceolate (spear-shaped), 1ft. to 1½ft. long, 3in. to 4in. broad, and simply pinnate (only once divided to the midrib); the pinnæ (leaflets), of a leathery texture, disposed on each side, are of peculiar form, the upper ones being nearly square, 1in. long, and almost stalkless. The inferior pinnæ are longer, and have their lower side more developed and their inner side imbricated (overlapping) over the midrib. The sori (spore masses) are numerous, straight, and sometimes ½in. in length. —*Hooker*, *Synopsis Filicum*, p. 472.

A. Hendersonii—Hen-der-so′-nĭ-i (Henderson's). A variety of *A. tetraphyllum.*

A. Henslovianum—Hen-slo-vĭ-a′-num (Henslow's), *Hooker.*

This beautiful and most distinct, stove species, also known as *A. lætum*, *A. Reichenbachii*, and *A. sessilifolium*, is a native of Columbia and Peru, and is of quite a different aspect from all other Adiantums, as the stipes (stalks), instead of being as usual thin, black, and polished, are thick, green, and gradually become of a dark chestnut-brown colour and slightly hairy. The fronds, which are produced from a creeping rhizome (prostrate stem), are from 1ft. to 1½ft. long, 6in. to 9in. broad, and of a peculiarly arching (half-drooping) character. They are tripinnate (three times divided to the midrib), with the lower pinnæ (leaflets) slightly branched and having numerous pinnules (leafits) of a delicate texture and light green in colour: the lower line of the pinnules is nearly straight, while the upper margin is somewhat rounded and lobed, and the point bluntly rounded. The reniform (kidney-shaped) sori (spore masses) are abundantly produced in the hollows of the lobes. This species is also readily distinguished from most others by the peculiarity possessed by its pinnules, the inner edge of which usually overlaps the midrib. See Plate (for which we are indebted to Messrs. J. Veitch and Sons).—*Hooker*, *Species Filicum*, ii., p. 43. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. Henslovianum is of very easy culture, but, being entirely deciduous, requires a period of rest from November to February, when it is almost, if not entirely, leafless.

A. Hewardia—Hew-ard′-ĭ-a (Heward's), *Kunze.*

This stove species, of small dimensions, also known under the name of *Hewardia adiantoides*, is a native of Jamaica. Its fronds, pinnate or bipinnate (once or twice divided to the midrib), borne on erect, black, glossy stalks

6in. to 9in. long, are composed of a terminal pinna (leaflet) and of two to four lateral ones on each side, the lowest pair of which sometimes bear two to four pinnules (leafits) each. The pinnules are from 3in. to 4in. long, about 1in. broad, nearly equal-sided except at the base, and almost entire. The sori (spore masses) are disposed in continuous lines along both edges of the pinnules. This is one of the few Adiantums with veins anastomosing (intermixing), and the texture of the fronds being thin and paper-like, these veins distinctly show a sort of network which is almost unique in the genus. —*Hooker*, *Species Filicum*, ii., p. 7. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. hians—hĭ′-ans (gaping), *Moore.*

An ornamental, stove Maidenhair, native of the South Pacific Islands, with triangular fronds about 10in. long and tripinnate (three times divided to the midrib). The upper pinnæ (leaflets), which are egg-shaped and borne on short stalks, and the almost stalkless lower ones, are both furnished with pinnules (leafits) of variable form, but mostly roundish or balloon-shaped, bearing at their rounded summit one or two large, broadly-gaping sori (spore masses).—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. hirtum—hir′-tum (shaggy), *Klotzsch.*

A very handsome, though little-known, tropical American, stove species, whose habitat ranges from Panama and Guiana southward as far as Peru and Brazil. Its fronds, closely and regularly branched like those of the popular *A. formosum*, are borne on wiry, upright, polished stalks of a dark chestnut-brown colour. They are composed of a terminal pinna (leaflet) and of several pairs of erecto-patent (upright and spreading) lateral ones, all of which are furnished with numerous pinnules (leafits) of sub-coriaceous (almost leathery) texture and whose upper margin is bluntly rounded and finely toothed. These pinnules are closely set together: the lower ones are slightly stalked and the others quite sessile (stalkless); their under-surface is slightly, and their stalks densely, hairy. The venation, though fine, is prominent. The sori (spore masses) are small, numerous, oblong, and very close: they are disposed in small lobes on the upper and outer margin.—*Hooker*, *Species Filicum*, ii., p. 20, t. 82A.

A. hispidulum—his-pid′-ul-um (slightly hairy), *Swartz.*

This is a very handsome, greenhouse species, native of Australia and New Zealand; it is extensively known and cultivated under the name of *A. pubescens.* Its fronds, borne on slender yet stiff, erect, hairy stipes (stalks) 8in. to 15in. long, are of a peculiar dichotomous form, their main divisions being branched and forked again; they consist of a terminal pinna (leaflet) 6in. to 9in. long, ½in. to 1in. broad, and of others that gradually become smaller, all of which are furnished with very small pinnules (leafits) only ¼in. to ⅓in. broad, almost stalkless, and of a peculiar leathery texture. These pinnules, which have their outer edge bluntly rounded and their upper or outer margin finely toothed, are when mature hairy and of a dark green colour, but of a bright metallic or coppery tint when only partly developed. The sori (spore masses) are roundish and abundantly produced, being disposed from six to eight on each pinnule, where they are so closely set as to form an uninterrupted line.—*Hooker*, *Species Filicum*, ii., p. 31. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 13A.

A. Hookeri—Hook′-er-i (Hooker's). A variety of *A. Capillus-Veneris.*

A. imbricatum—im-bric-a′-tum (overlapping). Perhaps the most distinct of all the varieties of *A. Capillus-Veneris.*

A. incisum—in-ci′-sum (cut), *Presl.*

This stove species, native of the West of Mexico and Columbia, is very closely related to the better-known *A. pulverulentum;* but its fronds, which are borne on wiry, almost black, polished stipes (stalks) 4in. to 6in. long, are smaller in all their parts and less branched, being only once divided to the midrib, with occasionally one or two pairs of short, spreading branches at their base. The pinnules (leafits), which are of a sub-coriaceous (almost leathery) texture, are of the same shape, the lower line nearly straight, the upper one almost parallel, and, like the outer edge, finely toothed; but they are of larger dimensions and more deeply toothed than those of *A. pulverulentum.* The sori (spore masses) are disposed in a continuous, marginal line on the edge of the lower two-thirds of the upper margins.—*Hooker*, *Species Filicum*, ii., p. 16.

A. intermedium—in-ter-med′-ĭ-um (intermediate), *Swartz.*

This very handsome, evergreen, stove species, also known under the names of *A. fovearum* and *A. triangulatum*, has a very extensive range of habitat, for it is found from Mexico and the West Indies southwards to Peru and Rio Janeiro. Its fronds, which consist of a terminal pinna (leaflet) 6in. to 9in. long and 2in. to 3in. broad and of one to three small, spreading lateral ones on each side, are borne on strong, erect, polished but somewhat tomentose (downy) stalks 6in. to 12in. long, attached to a creeping rhizome (prostrate stem). The pinnules (leafits) are wedge-shaped at the base, the upper part being parallel with the stalk; they are of almost leathery texture, of a deep green colour, and conspicuously dented. The oblong sori (spore masses) are numerous and disposed in interrupted, marginal patches one to two lines across, placed round the upper edge and outer two-thirds of the lower one. If only on account of the effect produced by its bold, prominent sori and hirsute (hairy) stalks, this interesting Fern, which somewhat resembles the better-known *A. tetraphyllum* in general appearance, deserves a place in every collection.—*Hooker*, *Species Filicum*, ii., p. 25. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 20.

A. Kalon—Kal′-on (Kalon). A variety of *A. Capillus-Veneris.*

A. Kaulfussii—Kaul-fus′-sĭ-i (Kaulfuss's), *Kunze.*

A stove species, of medium size, native of the West Indies, Brazil, and Peru, having fronds 6in. to 12in. long and 3in. to 4in. broad, borne on wiry, upright, polished, blackish stipes (stalks) 6in. to 9in. long. These fronds consist of a large, coriaceous (leathery) terminal lobe and of eight to ten pinnæ (leaflets) on each side of the midrib; the lowest, 2in. to 3in. long and about 1in. broad, are cordate (heart-shaped) and auricled (eared) at the base, and are borne on short stalks; those of the barren fronds are slightly toothed. The sori (spore masses) are disposed in interrupted lines on the margin of the leaflets.—*Hooker*, *Species Filicum*, ii., p. 7.

A. Kunzeanum—Kunz-ĕ-a′-num (Kunze's). This is synonymous with *A. cristatum.*

A. lætum—læ′-tum (joyful). Synonymous with *A. Henslovianum.*

A. Lathomi—La′-thom-i (Lathom's), *Moore.*

A beautiful, garden variety, possibly a natural sport from *A. Ghiesbreghtii* (*A. scutum* of commerce), which it somewhat resembles, though it differs from that species in having a gracefully-drooping instead of a semi-erect habit. Its pendulous and massive fronds, which are produced from a tufted crown, measure, when fully developed, 2½ft. to 3ft. in length, including the smooth, black, shining stipes (stalks) on which they are borne. They are pentangular (having five angles) in shape, from the enlargement of the basal pinnules (leafits) of the lowest pair of pinnæ (leaflets), are quadripinnate (four times divided to the midrib), and furnished with very large, imbricated (overlapping) pinnules. The roundish or kidney-shaped sori (spore masses) are disposed in the lobes of the upper margin of the pinnules. This is one of the most ornamental of the large-growing Maidenhairs in cultivation, and quite as useful in its way as the smaller *A. cuneatum* and varieties.—*Nicholson, Dictionary of Gardening*, i., p. 27.

A. Lawsonianum — Law-so-nĭ-a′-num (Lawson's). This is a variety of *A. cuneatum.*

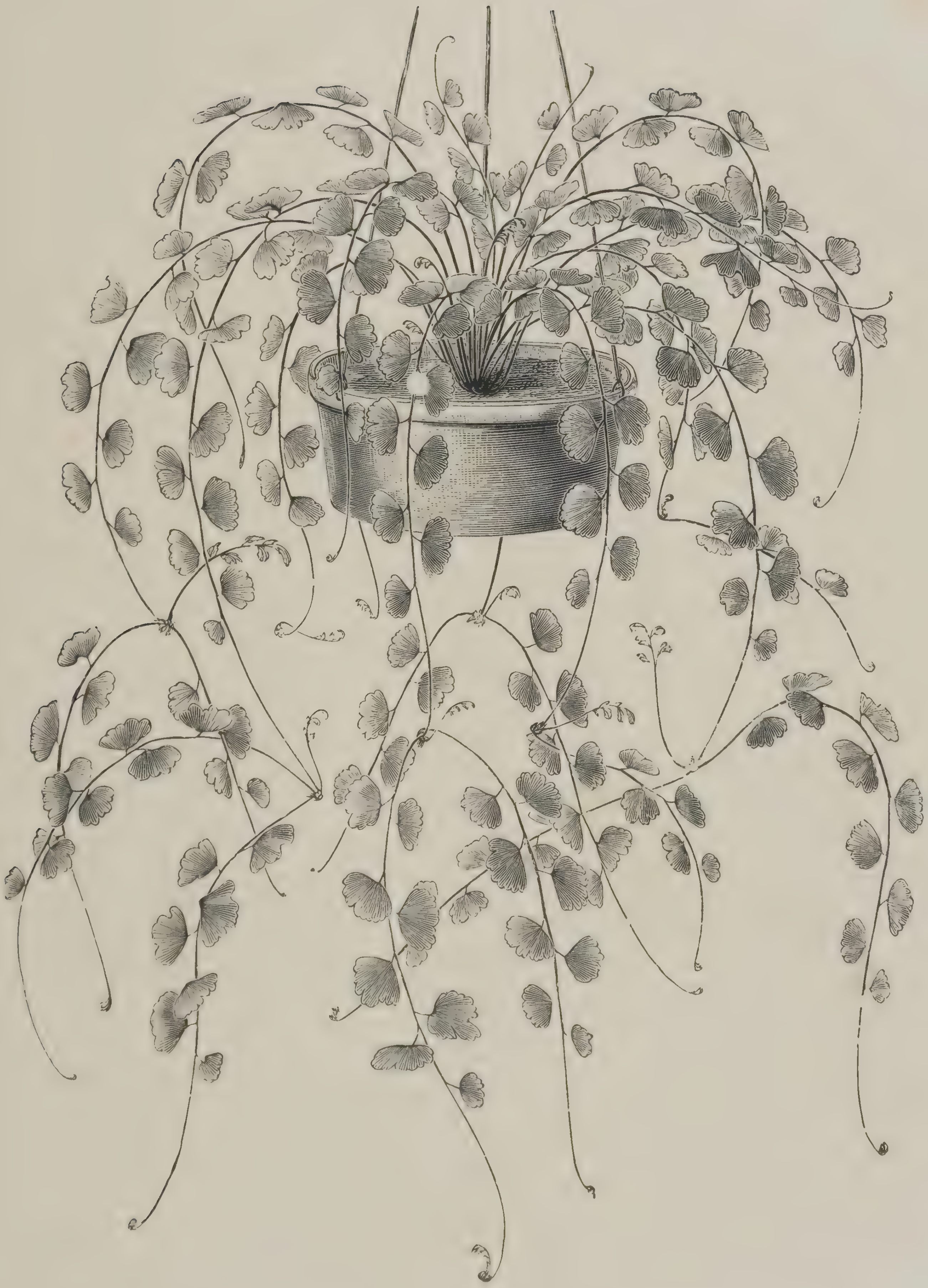
A. Legrandi—Leg-rand′-i (Legrand's). A variety of *A. cuneatum.*

A. Leprieurii—Lep-rieur′-ĭ-i (Leprieur's), *Hooker.*

A stove species, of no great decorative value, but interesting on account of the anastomosing (intermixed) veins of its foliage. It grows to a height of about 1½ft., and is a native of British Guiana.—*Hooker, Species Filicum*, ii., p. 31, t. 82B.

A. Lindeni—Lin′-den-i (Linden's), *Moore.*

This is a magnificent, stove species, native of the Amazon Valley. Its large, erect (upright) fronds, borne on black stipes (stalks) 9in. to 12in. long, are tripinnate (three times divided to the midrib) and furnished with falcate (sickle-shaped) pinnules (leafits) 1½in. long, having their outer margins closely but bluntly lobed: these pinnules are of a peculiarly deep green colour and their lobes are toothed. The oblong or kidney-shaped sori (spore masses) are disposed in interrupted lines along the superior margin of the pinnules.—*Hooker, Synopsis Filicum*, p. 473. *Nicholson, Dictionary of Gardening*, i., p. 27.



Adiantum lunulatum dolabriforme

(⅓ nat. size).

A. lucidum—lu′-cid-um (shiny), *Swartz.*

A distinct, stove species, of medium growth, native of the West Indian Islands, Panama, and Brazil. The fronds, 9in. to 15in. long and 4in. to 8in. broad, are produced from a creeping rhizome (prostrate stem) and borne on strong, upright stipes (stalks) 6in. to 9in. long, which are densely covered with short hairs of a ferruginous (rusty) colour: they are simply pinnate (only once divided to the midrib) and consist of a large terminal pinna (leaflet) and six to ten lateral ones on each side. These pinnæ are 3in. to 4in. long and about 1in. broad, nearly equal-sided, slightly dented towards the point, wedge-shaped at the base, of a bright olive-green colour, and shining on both sides. The lower leaflets are sometimes slightly branched. The oblong sori (spore masses) are disposed in a continuous row along each side.—*Hooker*, *Species Filicum*, ii., p. 4, t. 79C. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 4A.

A. Luddemannianum — Lud-dem-an-nĭ-a′-num (Luddemann's). A specially striking crested variety of *A. cuneatum.*

A. lunulatum—lu-nul-a′-tum (crescent-leaved), *Burmann.*

This is a very distinct and handsome, stove species, of exceptionally widespread habitat, for it is found in Hong-Kong, in Cochin China, on the Himalayas at an elevation of 4000ft., southward to the Polynesian Islands and Tropical Australia, Madagascar, Angola, Guinea, in Tropical America from Mexico southward to the Organ Mountains in Brazil, &c. It is an easily-recognised species, of deciduous habit, losing its fronds about December and starting into growth again about the beginning of March. It has a peculiarly slender, pendulous habit, and is proliferous at the end of its fronds—so much so, that it is not rare to see produced from their apices three generations of plants. The fronds, which spring from a tufted crown and are borne on wiry, flexible stipes (stalks) 6in. to 12in. long, are simply pinnate (only once divided to the midrib), from 10in. to 15in. long and about 2in. broad. The pinnæ (leaflets), which are about 1in. broad and 1in. deep, are of a bright green colour, sub-dimidiate (nearly fully developed on one side and scarcely at all on the other), their lower edge being nearly in a line with the short stalks on which they are borne; their upper edge is rounded and, like the sides, usually more or less lobed.

The sori (spore masses), which are numerous, are disposed in a continuous line along the edge. When the fronds are mature, the stalks are of a beautiful shining black colour, while those in course of development are of a deep pink, and then of a light brown tint, quite different to those of all other species.—*Hooker*, *Species Filicum*, ii., p. 15. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 8B.

On account of its pendulous habit and of its rapid growth, this is considered one of the best basket Ferns by all who grow it. The fact of its being deciduous accounts for its disappearance in many cases, as care must be taken during the winter that it does not become thoroughly dry, or it will never start into growth again. We have always found it do much better if kept moderately moist at the roots all the year round. Although under such treatment it does not get so much rest as if treated as a deciduous plant, we have frequently noticed that it starts much stronger into growth in the spring.

A. l. dolabriforme—dol-a′-brif-or′-mĕ (axe-shaped), *Hooker*.

This is merely an East Indian variety of the species just described, from which it differs principally by its evergreen character, as it remains in full foliage all through the year. It is also distinguishable by the slenderer nature of its fronds, which, like those of the species, are repeatedly proliferous. See Plate (for which we are indebted to Mr. B. S. Williams).

A. macrocladum—mac-roc′-lad-um (long-branched). Synonymous with *A. polyphyllum*.

A. macrophyllum—mac-roph-yl′-lum (long-leaved), *Swartz*.

This elegant, stove species, native of Mexico, the West Indian Islands, Brazil, and Ecuador, is one of the most distinct Ferns in cultivation. Its large, equal-sided leaflets, which in the young and partly-developed fronds are beautifully tinged with red, change with age to a most pleasing bright green colour. The handsome fronds, borne on erect, nearly black stalks 6in. to 12in. long, are produced in great abundance from an underground rhizome (prostrate stem); they are of a particularly upright habit, 9in. to 15in. long and 4in. to 8in. broad, and simply pinnate (only once divided to the midrib). The pinnæ (leaflets) are very large and somewhat irregular in form, the lower ones being 3in. to 4in. long and 2in. broad, so large at the base that the opposite ones frequently overlap: sometimes their margin is deeply dented, at other times their edges are nearly smooth, both forms being generally found on the same plant. The fertile pinnæ, of the same shape, are narrower than the barren ones, and the sori (spore masses) are disposed in continuous or slightly interrupted marginal

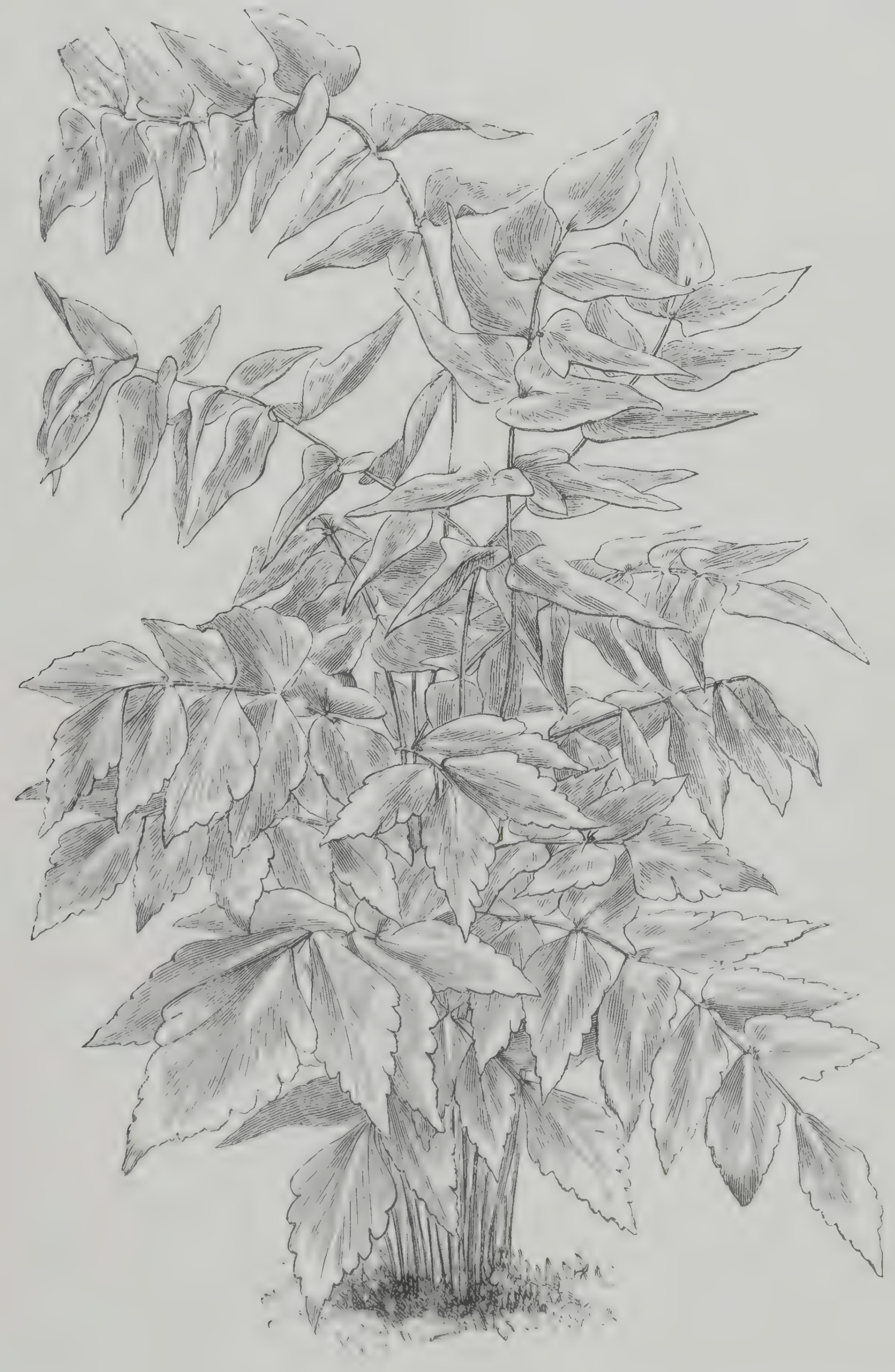


Fig. 42. *Adiantum macrophyllum*
(⅓ nat. size).

lines. See Fig. 42.—*Hooker*, *Species Filicum*, ii., p. 3. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 4B.

This species, which is one of the most decorative of our stove Ferns, requires a liberal supply of water and a shady situation, or it has a wretched appearance, its fronds becoming rapidly spotted.

A. m. bipinnatum—bip-in-na′-tum (twice pinnate), *Moore.*

A handsome variety, native of Jamaica, differing from the typical plant through having its fronds bipinnate (twice divided to the midrib) in the lower part. The pinnules (leafits) and the pinnæ (leaflets) of the upper part of the frond partake of the same bright pink colour peculiar to the species when in a young state, although they are of much smaller dimensions.—*Nicholson*, *Dictionary of Gardening*, iv., p. 484.

A. m. striatum—strĭ-a′-tum (striped), *Schneider.*

This remarkable variety, which originated among some seedlings raised by Mons. Chartier, at Montmorency, near Paris, is one of the prettiest of all known variegated Ferns. It is as vigorous as the typical *A. macrophyllum*, the upright habit of which it also possesses. The fronds are simply pinnate (only once divided to the midrib) and furnished with pinnæ (leaflets) of dimensions equal to those of the type, but they are irregularly though abundantly splashed and striped with white, which variegation produces a charming effect at all times, more especially when a batch of young, half-developed fronds are on the plant. The mixture of the bright pink, pale green, and white, of the pinnæ, and the dark chestnut-brown, almost black colour, of the polished stalks, form a most agreeable contrast with the tint of the mature fronds, on which the variegation remains conspicuous as long as they last. Until now this pretty variety has not been known to reproduce itself true from spores; but considering that all, or nearly all, other variegated Ferns are propagated from their own spores, it may reasonably be anticipated that this pretty form will be increased in the same way.

A. macropterum—mac-rop′-ter-um (long-winged). Synonymous with *A. dolosum.*

A. magnificum—mag-nif′-ic-um (magnificent). A variety of *A. Capillus-Veneris.*

A. Mairisii—Mair-is′-ĭ-i (Mairis'). A variety of *A. Capillus-Veneris.*

A. mexicanum—mex-ic-a′-num (Mexican). Synonymous with *A. glaucophyllum.*

A. microphyllum—mi-croph-yl′-lum (short-leaved), *Kaulfuss.*

This stove species, native of the West Indies, is very closely related to the better-known *A. pulverulentum*, which it resembles in general appearance. Its fronds, borne on strong, upright, tomentose (downy) stalks 6in. to 9in. long, consist of a terminal pinna 6in. to 9in. long and several erecto-patent (upright-spreading) ones on each side, the lowest of which are branched again. Their pinnules (leafits), ½in. to ¾in. long and about ¼in. broad, of a coriaceous (leathery) texture, are unequal-sided, falcate (sickle-shaped), and narrowed to a sharp point. The sori (spore masses) are disposed in a few elongated patches along the upper edge, where they form a slightly-interrupted line of fructification.—*Hooker, Species Filicum*, ii., p. 47.

A. monochlamys—mon-och′-lam-ys (once covered), *Eaton.*

This exceedingly pretty and entirely distinct, dwarf, greenhouse species, native of Japan, though closely related to the Himalayan *A. venustum*, is clearly distinct through its compact habit and glaucous (bluish-green) foliage. Its fronds, 6in. to 12in. long and 4in. to 6in. broad, are borne on wiry, upright, dark chestnut-brown stipes (stalks) 6in. to 9in. long and are tripinnate (three times divided to the midrib). The pinnæ (leaflets) are rather distantly placed, while the pinnules (leafits) are closely set, less than ½in. broad, cuneate (wedge-shaped) at the base, the upper edge rounded and slightly toothed; the latter are of a firm texture, of a light pea-green colour above and silvery beneath. In the fertile pinnules there is a decided notch in the upper edge, in the hollow of which is placed a single sorus (spore mass). The pleasing aspect of this plant renders it a most valuable Adiantum, the more so that it requires but little or no artificial heat for its cultivation. On that account it ranks as one of the best dwarf Ferns for the cool conservatory and the greenhouse. It has proved perfectly hardy in Cornwall and Devonshire, where it has withstood two consecutive winters without artificial shelter. See Fig. 43.—*Hooker, Synopsis Filicum*, p. 125. *Nicholson, Dictionary of Gardening*, i., p. 27.

A. monosorum—mon-os-o′-rum (having one spore mass to a pinnule), *Baker.*

A pretty, stove species, native of the Solomon Islands, with fronds 9in. in length and about the same in breadth, borne on very slender, black, polished stalks, and furnished with short-stalked pinnæ (leaflets) 4in. to 5in. long, the lowest of which are forked at the base. The pinnules (leafits) are short-stalked, closely set, and of a chartaceous (parchment-like) texture; both their surfaces are smooth. The sori (spore masses) are large and round; one is disposed in the centre of the upper edge of each pinnule. This species certainly deserves a place in our gardens.—*Hooker*, *Synopsis Filicum*, p. 472. *Nicholson*, *Dictionary of Gardening*, i., p. 27.

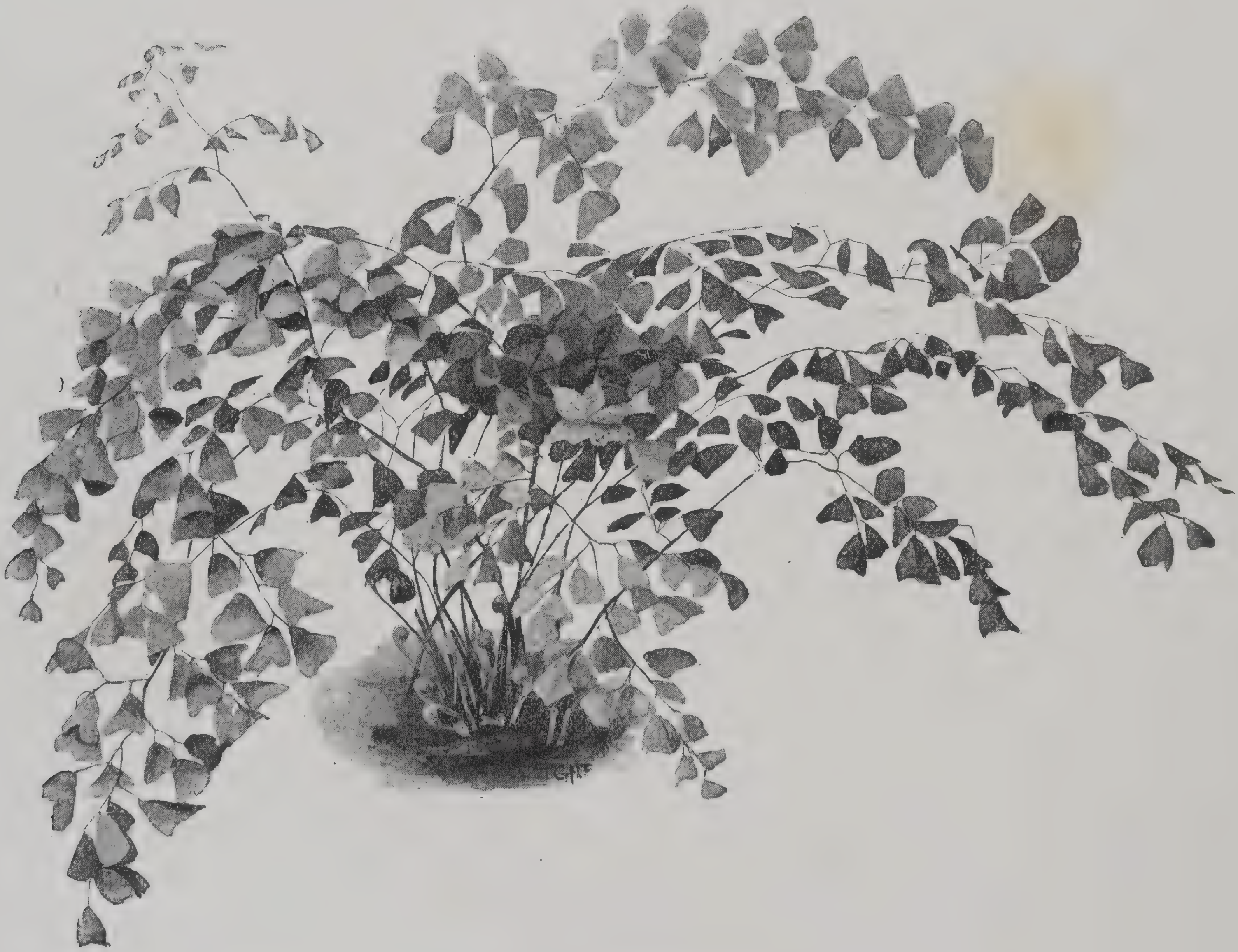


Fig. 43. Adiantum monochlamys
(¼ nat. size).

A. Moorei—Moor′-ĕ-i (Moore's), *Baker*.

This is a remarkably elegant, stove species, native of Peru. It is much more generally known in gardens as *A. amabile*, under which name it was described by Moore in the "Gardeners' Chronicle" of 1868, p. 1090, when imported alive, and afterwards distributed by Messrs. J. Veitch and Sons, who had received it from their collector, Pearce. This name was allowed to remain unchallenged until 1873, and that sufficiently accounts for the firm hold which it had taken of the general public. It was only in the "Gardeners' Chronicle" of 1873, p. 811, that Mr. Baker observed that the name *amabile* had already been applied in the genus by Liebmann to a Mexican plant, fully described under that name in "Mexicos Bregner," No. 113, published in 1849, a fact which had been totally overlooked by Mr. Moore, to whom Mr. Baker then dedicated the new-comer. Liebmann's *A. amabile*, according to his own specimens in the Kew Herbarium, is not thought specifically distinct from *A. glaucophyllum* of Hooker or *A. mexicanum* of Presl, but the one of which the following is a complete description is totally distinct, though still known in commerce as *A. amabile*. Its handsome fronds, which frequently attain 2ft. in length by 1ft. or more in breadth, are borne on slender, black, shining stalks 6in. to 9in. long. They are deltoid (in the form of the Greek delta, Δ), bi- or tripinnate (twice or three times divided to the midrib), and are furnished with numerous pinnules (leafits) borne on short footstalks and set somewhat far apart, which gives the fronds a peculiarly light and feathery appearance, the more so that they are deeply lobed on their outer margin, where the sori (spore masses), round or nearly so, are situated at the extremity of the lobes. Mr. Moore, in his description, says that the appearance of this plant suggests a relationship to *A. concinnum* and *A. cuneatum* through its pendulous habit and the shape of its pinnules, and adds that "there is no doubt it is allied to both of them and also to *A. colpodes*." He further says, "A peculiar and distinctive aspect is given to *A. amabile* by the deep forked lobes of the pinnules generally, and especially by that of the enlarged pinnule which terminates the primary and frequently the secondary pinnæ." Whatever the value of Moore's conjectures and suppositions as regards the origin of this Fern may be, it must be admitted that it has proved very variable under cultivation, and that its influence as a possible parent may safely be traced in the production of various handsome garden forms, such as *A. Daddsii*, *A. fragrantissimum*, *A. Oweni*, *A. Waltoni*, &c., all of which partake more or less of its elegant habit and mode of growth. *A. Moorei* also possesses the peculiarity of reproducing itself freely by means of the little bulbils borne on its fine, fibrous roots.—*Hooker*, *Synopsis Filicum*, p. 474. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Moore*, *Gardeners' Chronicle*, 1868, p. 1090.

A. Moritzianum—Mor-itz-ĭ-a′-num (Moritz's). A variety of *A. Capillus-Veneris*, having long, pendulous fronds.

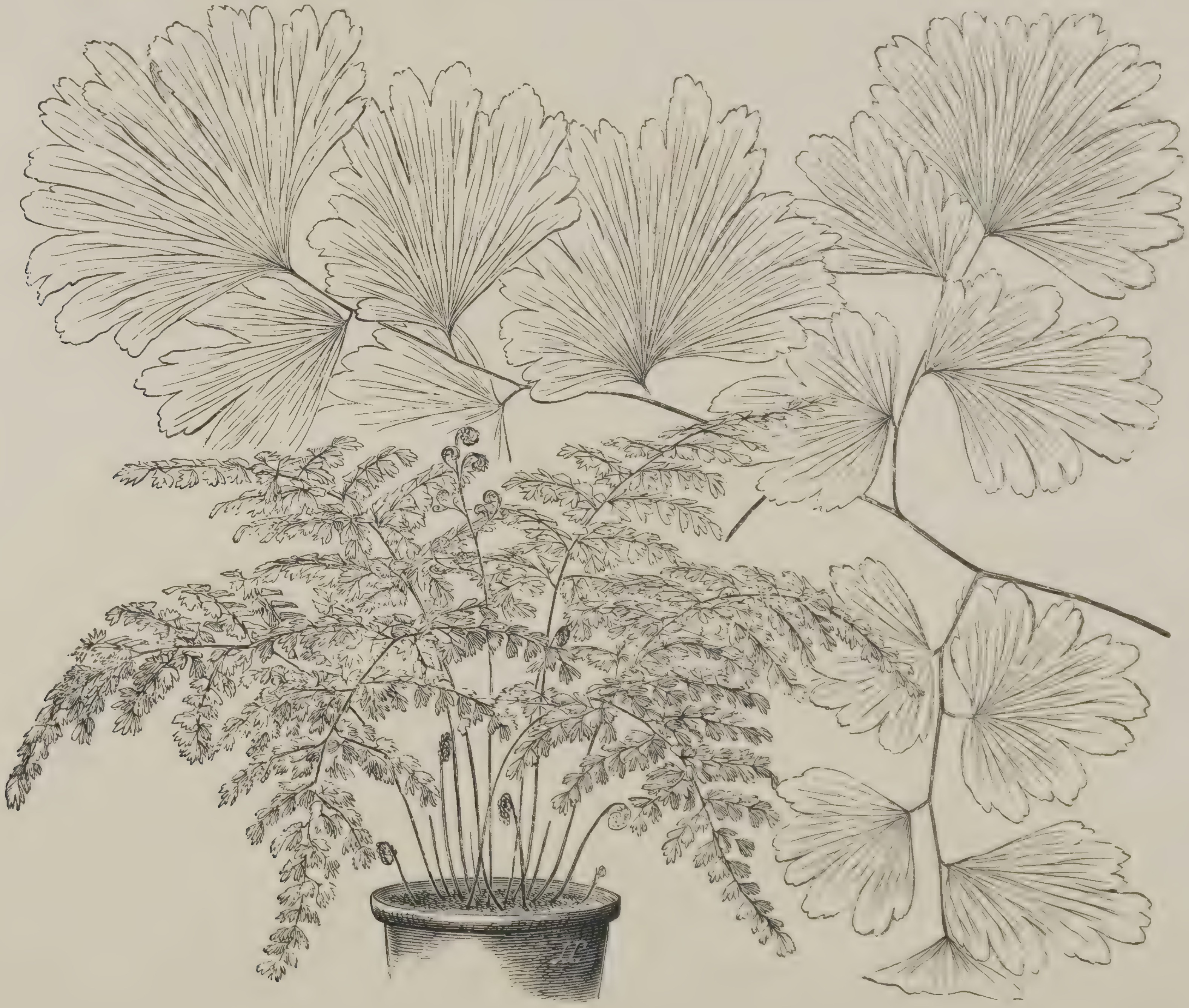
A. mundulum—mun′-dul-um (neat). A dwarf variety of *A. cuneatum.*

A. neoguineense—nĕ-ŏ-guin-e-en′-sĕ (New Guinea), *Moore.*

A very pretty, stove species, native of New Guinea, with fronds rather sparsely produced from a short, creeping rhizome (prostrate stem) and borne on upright stipes (stalks) 6in. to 8in. long and of a bright chestnut-brown colour. These fronds, of an elegant, arching habit, are tri-quadripinnate (three or four times divided to the midrib) and furnished with pinnules about ½in. long, which are lobed and dented and set rather far apart. The pinnules (leafits) are of a dark olive-green colour, with a bluish tint on both surfaces, and being loosely set they give the plant a very elegant appearance. The sori (spore masses) are small, round, six to eight to each pinnule, in the closed depressions of the marginal lobes of which they are entirely sunk. —*Nicholson*, *Dictionary of Gardening*, i., p. 27.

A. nigrescens—nig-res′-cens (blackish), *Fée.*

A stove species, from Guadeloupe. Its fronds, borne on upright, blackish stipes (stalks) 6in. to 12in. long, consist of a terminal pinna (leaflet) and several lateral ones on each side, the lowest of which are again branched. The pinnules (leafits) are about ½in. long and ¼in. broad; they are of a leathery texture and have their point bluntly rounded and their upper and outer edges finely toothed. The sori (spore masses) are disposed in oblong patches along the upper edge. In general habit this plant comes somewhat near *A. cristatum.* It may be readily distinguished from all other species having any affinity with it by its pinnules, which are smaller than those of any other and also of a more leathery texture.—*Hooker*, *Synopsis Filicum*, p. 117.



Adiantum digitatum (speciosum), showing Habit and detached Pinna
(Habit, $\frac{1}{10}$ nat. size; Pinna, nat. size).

A. novæ-caledoniæ—nov′-æ-cal-e-don′-ĭ-æ (from New Caledonia), *Moore.*

This handsome, stove species, native of New Caledonia, is entirely distinct from any other Adiantum in cultivation. Its fronds, which are borne on slender stipes (stalks) 6in. to 9in. long, of a blackish-purple colour and densely clothed with dark brown hair-like scales, are of a peculiar shape: they are pedately pentagonal (in the form of a bird's foot with five distinct sides) in outline, tripinnate (three times divided to the midrib) in their basal part, and only twice pinnate above. The pinnæ (leaflets) are narrow-lanceolate (narrowly spear-shaped), the larger ones being caudate (ending in a tail); they are abundantly furnished with equally distinct pinnules (leafits), coarsely toothed and irregular in size and in form, the largest frequently measuring 1½in. long. The colour of the pinnules is a peculiar greyish-green when mature, but they are of a lovely metallic tint when partly developed, and the way in which they are deeply dented and overlap each other renders the plant most interesting and gives it a very decorative appearance. See Plate (for which we are indebted to Messrs. W. and J. Birkenhead).—*Nicholson*, *Dictionary of Gardening*, iv., p. 485.

When subjected to the influence of a very moist stove atmosphere, the fronds of this beautiful species are liable to become of a blackish colour, but this may easily be avoided by allowing a little more air than is given to Maidenhairs in general.

A. oblique-truncatum—ob-li′-quĕ-trun-ca′-tum (obliquely and suddenly cut off). A synonym of *A. villosum.*

A. obliquum—ob-li′-qŭ-um (oblique), *Willdenow.*

A very interesting, stove species, of compact habit, native of the West Indian Islands, British Guiana, and Guadeloupe. It is much in the way of *A. Kaulfussii*, and differs from that species principally through its fronds being of thinner texture and mostly fertile, dark green above but glaucous (bluish-green) on their under-surface; they are 9in. to 12in. long and 2in. to 4in. broad, produced from a creeping rhizome (prostrate stem), and borne on wiry but slightly hairy stalks. The plant is also quite distinct from *A. Kaulfussii* by the disposition of its sori (spore masses), which are numerous, from fourteen to sixteen on a pinnule (leafit), oblong, and situated along both the upper and the lower margin, where they form almost continuous lines.—*Hooker*, *Species Filicum*, ii., p. 8, t. 79A. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 13B.

A. o. minus—min′-us (lesser), *Moore*.

This plant, native of Columbia, has all the appearance of being but a form of the species just described. It differs from the type in its smaller dimensions ; the fronds, borne on black stalks, are pinnate (once divided to the midrib) ; the pinnæ (leaflets), disposed on each side of the midrib, are falcate (sickle-shaped) and terminate in a point, the barren ones being toothed, while the fertile ones have their edges covered with sori (spore masses) of oblong shape, and their extremity, instead of being pointed, is conspicuously lobed.—*Nicholson*, *Dictionary of Gardening*, iv., p. 485.

A. obtusum—ob-tu′-sum (blunt), *Desvaux*.

This stove species, which appears to be identical with *A. serratodentatum* of Willdenow, is a native of the West Indian Islands ; it is also found in countries extending from Panama southwards to Peru and Rio Janeiro. Its distinct fronds, which are borne on wiry, blackish, slightly downy stipes (stalks) 6in. to 12in. long, consist of a terminal pinna and several pairs of lateral pinnæ (leaflets), all of which are abundantly furnished with pinnules (leafits) of a leathery texture, dark green in colour, and of a particularly glossy nature : these pinnules are of a peculiar shape, the lower line being nearly straight, while the upper one is bluntly rounded. The sori (spore masses) are numerous, and form oblong patches round the upper and outer edges of the pinnules, the lower edge never bearing any.—*Hooker*, *Species Filicum*, ii., p. 19.

A. Oweni—O′-wen-i (Owen's), *Moore*.

This supposed stove hybrid, of garden origin, is one of the most graceful among all the Adiantums in cultivation. It belongs to the series of plants which Mr. Moore regards as probably resulting from natural hybridisation between *A. Moorei* (*A. amabile* of commerce) and *A. cuneatum*, and the general appearance of the plant certainly warrants his assumption. In habit it is as elegant as *A. Moorei*, the pleasing pale green colour of which it also possesses ; whereas its fronds, which are about 1½ft. long and borne on black, slender stipes (stalks) about 8in. in length, are produced from a tufted crown in the same way as those of *A. cuneatum*. The leafy portion of the fronds is also of the same triangular shape as in that popular species, but the pinnæ (leaflets) are disposed further apart and borne on

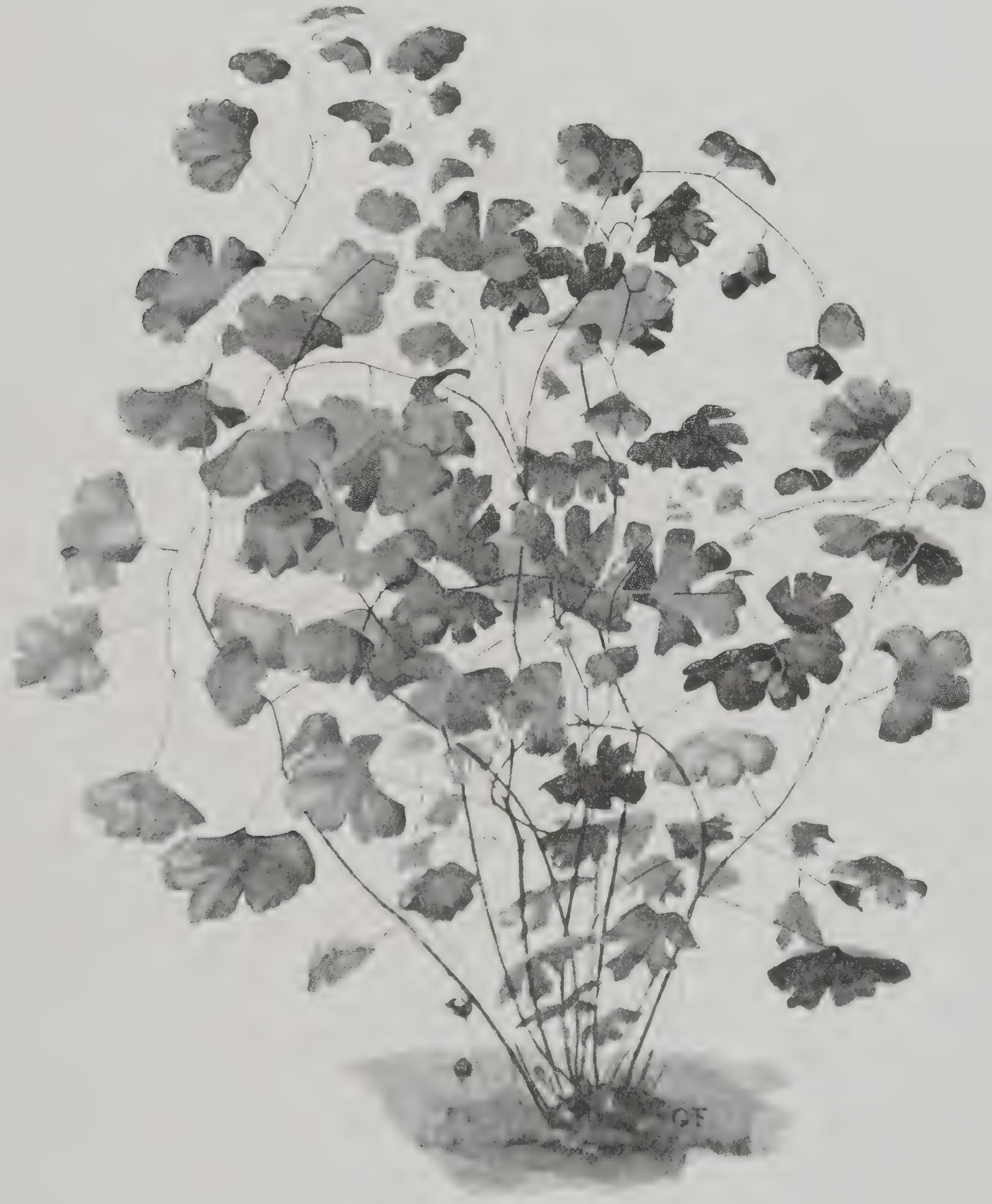


Fig. 44. Adiantum palmatum
(⅓ nat. size).

distinct stalks, the lower ones being about 1in. long and the others becoming gradually shorter as they approach the summit of the frond, which is usually terminated by a large cuneate (wedge-shaped), two- or three-lobed pinnule (leafit). The other pinnules are very small, rhomboid (with four equal sides), borne on short footstalks, and slightly lobed. The sori (spore masses) are sometimes kidney-shaped and sometimes almost round, and are disposed two to four to a pinnule and placed in a sinus (depression) of the marginal lobes.—*Nicholson, Dictionary of Gardening*, iv., p. 485.

A. Pacottii—Pac-ot′-tĭ-i (Pacotto's). A variety of *A. cuneatum.*

A. palmatum—pal-ma′-tum (palmate or hand-shaped), *Moore.*

A very beautiful and graceful Fern, native of Peru, which thrives equally well under either greenhouse or stove treatment. Its handsome and particularly light fronds, produced from a stout, underground, prostrate stem, are borne on very slender stipes (stalks) 9in. to 12in. long, shining black, but rather downy at the base; they are tripinnate (three times divided to the midrib), often reaching 3½ft. in length by 10in. in breadth. The pinnules (leafits), which are distinctly stipitate (stalked), are of comparatively large dimensions, being 1in. to 1¾in. broad; they are of a thin texture, smooth, set far apart, and vary in shape from obovate-cuneate (between egg-shaped and wedge-shaped) to semi-orbicular (half-circular) in outline, but all are deeply cut down into from three to five large lobes, which are again more or less divided (Fig. 44). The sori (spore masses), oblong in shape and of variable length, are disposed at the tips of the lobes, usually one to each.—*Nicholson, Dictionary of Gardening*, i., p. 27.

A very noticeable feature is the flexuose (zigzag) character of the rachis (stalk), most marked towards the terminal end of the frond, and on that account this species is particularly well adapted for basket culture. Grown in that way it soon makes a very handsome plant, specially attractive through the pale-green colour of its foliage. It is deciduous, losing its fronds about November and starting into fresh growth about March, but should not at any time be allowed to get quite dry at the roots.

A. Parishii—Par-ish′-ĭ-i (Rev. C. S. Parish's), *Hooker.*

This extremely pretty and curious, stove species, native of Moulmein—where, according to Beddome, it is found growing wild on a limestone rock called Twa-Cabin, at an elevation of 2000ft.—has never, to our knowledge, been brought into Europe in a living state. It may be hoped that its introduction to our collections will soon take place, for it is entirely distinct from any other known Fern. Its peculiar sub-orbicular (nearly circular) and slightly undulated fronds, about 1in. each way and cuneate (wedge-shaped) at the base, are produced from small crowns furnished with only a few fibrous roots of a peculiar downy or hairy nature, and are borne on tufted, slender, polished stalks of a dark brown colour and about ½in. in length. These fronds are of a membranous-pellucid (papery-transparent) texture; the barren ones are crenato-dentate (notched and toothed) all round, while the fertile ones have from three to five lobes separated by deep sinuses (depressions), in which the sparingly-produced spore masses are disposed. See Fig. 45 (reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author).—*Hooker*, *Species Filicum*, ii., p. 237, and v., 3, t. 142A.

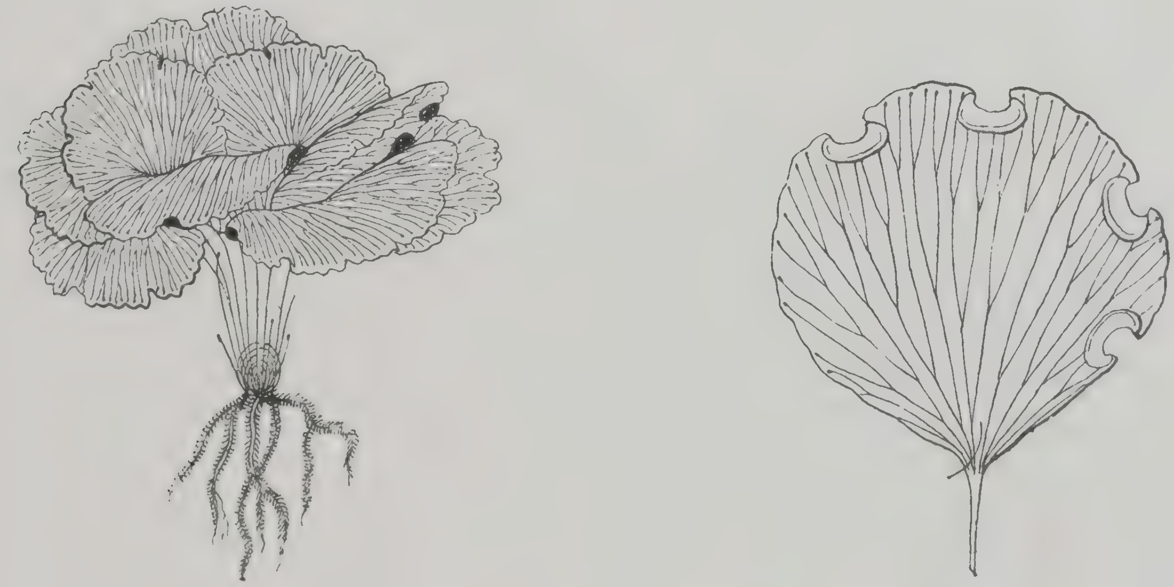


Fig. 45. Adiantum Parishii, showing Habit and detached Frond
(Habit, nearly nat. size; Frond, slightly enlarged).

A. patens—pat′-ens (spreading), *Willdenow.*

A stove species, native of Brazil and Mexico, readily distinguished from all other species belonging to the *Pedatum* group through the large, horny, sub-orbicular involucres (nearly circular coverings of the spore masses), which are nearly ⅛in. in breadth and almost as deep. The fronds, borne on upright stalks of a chestnut-brown colour, polished but slightly downy, are dichotomously divided (their main divisions being branched once or twice again):

the central pinnæ (leaflets) are from 6in. to 9in. long and about 1½in. broad; the pinnules (leafits) are ½in. to ¾in. long by ¼in. deep, dimidiate (fully developed on one side and scarcely at all on the other), with the two sides nearly parallel, the upper and outer ones broadly and bluntly lobed. The roundish or kidney-shaped sori (spore masses) are disposed round the upper and outer edges of the pinnules.—*Hooker*, *Species Filicum*, ii., p. 29, t. 87A. *Nicholson*, *Dictionary of Gardening*, i., p. 27.

A. pectinatum—pec-tin-a′-tum (comb-like), *Kunze.*

This very fine, robust, stove species, native of Brazil and Eastern Peru, is distinctly characterised by its habit, as also by the large size of its fronds, which are borne on strong, upright, scabrous (rough), and nearly black stalks. These fronds, from 3ft. to 6ft. long and from 2ft. to 3ft. broad, are tri- or quadripinnate (three or four times divided to the midrib); the lower pinnæ (leaflets), 1ft. to 1½ft. long and 6in. to 9in. broad, have their lower branches formed of a long terminal pinnule (leafit) and several erecto-patent (upright and spreading) lateral ones, the lowest of which are sometimes also branched again. The pinnules, ½in. broad and less than ¼in. deep, are dimidiate (one side being fully developed and the other scarcely at all); their lower line is straight, their upper one slightly rounded, and their point not very blunt. The numerous spore masses are sub-orbicular (nearly round) and disposed round the upper and outer edge.—*Hooker*, *Synopsis Filicum*, p. 120.

A. pedatum—ped-a′-tum (bird's-foot-shaped), *Linnæus.*

This thoroughly distinct and magnificent species, although given as a native of British India by Beddome—who figures it from a specimen gathered at Dalhousie, adding that, in the Himalayas, it grows at 2500ft. to 3000ft. elevation—of North Hindostan, where it is said to grow at an elevation varying between 7ft. and 9000ft.; of Japan, &c., is essentially a Fern from North America, where it is extensively distributed, being met with in abundance from New Brunswick and Canada to Alabama: it is also found plentifully in Utah, Oregon, California, British Columbia, Wisconsin, Arkansas, &c. North American Ferns are mostly valued for their hardiness and usefulness, producing as they do in the outdoor Fernery a contrast which could not possibly be obtained by planting British species and varieties alone. Some of them, too, are individually interesting, and foremost among these is *A. pedatum*, on account of its unique appearance, robust growth, and distinctive character. North America, although exceedingly rich in Ferns, produces but three Adiantums—viz., *A. æthiopicum emarginatum*, *A. Capillus-Veneris*, and *A. pedatum*. The first two are not hardy—at least, no more so than our native species; but the last-named, in its native country, will bear over 30deg. of frost. There, it is true, it is naturally protected by a thick layer of leaves, which annually covers its crowns when at rest; it is also protected each year by a covering of snow. But we have it on the authority of E. J. Lowe, who considers it a useful and ornamental Fern, that "being equally at home in the open Fernery or in the stove or greenhouse, it is the most hardy of all Adiantums;" and that "it can, under this climate, withstand a cold that would be certain death to the British *A. Capillus-Veneris*." Mr. Lowe states that "in January, 1854, plants of *A. pedatum* lived out of doors with the temperature of 6deg. below zero of Fahrenheit's thermometer, whilst near them the same cold killed all the plants of *A. Capillus-Veneris*." In Canada this Fern grows abundantly in moist woods, especially among rocks: in such places it forms, under the shelter of trees, patches often covering several acres at a stretch. It is very peculiar in growth: its

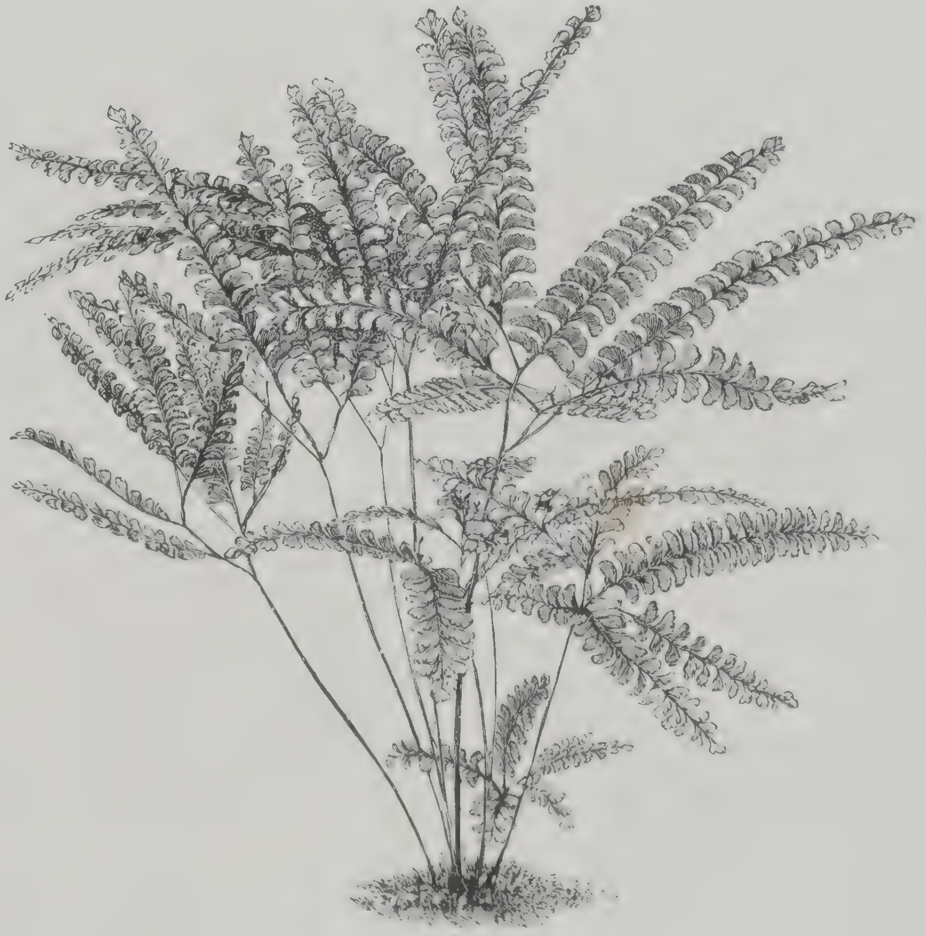


Fig. 46. Adiantum pedatum
(greatly reduced).

singularly pedate fronds are borne on upright, dark purplish, shining stipes (stalks) of a fragile nature; these are produced from the extremity of long, underground rhizomes (prostrate stems), which, through the annual fall of leaves and their accumulations, often lie buried 6in. deep, or even more, in decayed vegetable matter, the fronds having to get through this before they can reach the surface of the soil. According to eye-witnesses, such masses of *A. pedatum*, with its light pea-green coloured foliage, are a grand sight. The fronds are dichotomous (with main divisions repeatedly forked) and are borne on stalks 9in. to 2ft. long, their central pinnæ (leaflets), 6in. to 12in. long and 1in. to 1½in. broad and the lateral ones gradually shorter, having shortly-stalked pinnules (leafits) of very thin, papery texture, ½in. to ¾in. long and ¼in. deep, fully developed on the side nearest the stem, and with their upper and outer margins distinctly lobed (Fig. 46). The sori (spore masses) are roundish, one to two lines broad, and are abundantly produced and disposed on the tips of the lobes of the fertile pinnules.—*Hooker*, *Species Filicum*, ii., p. 28. *Nicholson*, *Dictionary of Gardening*, i., p. 27. *Eaton*, *Ferns of North America*, i., t. 18. *Beddome*, *Ferns of British India*, t. 167. *Lowe*, *Ferns British and Exotic*, iii., t. 14.

If in some places in England failure has attended the attempt at acclimatising this species outside, it is due to the fact that the underground rhizomes are generally kept too close to the surface of the ground, and that they are not protected in winter by either leaves or snow, and thus feel more keenly the effects of cold, though less severe than that of its own country. Although it is a perfectly hardy Fern, still, like the other so-called hardy Adiantums, it never grows so luxuriantly out of doors as it does in the greenhouse. Some of the Continental growers yearly produce remarkably handsome plants of this species in large quantities by inserting in early spring, round the edges of their rhododendron beds, small specimens of it, which form good clumps during the summer season. These are lifted from the ground about January, put in 5in. or 6in. pots, and placed in houses or frames in which the temperature is kept up to between 40deg. and 60deg. Under the influence of such temperature the crowns soon start into growth, and in a remarkably short space of time produce a crop of foliage which, on account of its pleasing light-green colour and elegant shape, makes the plant one of the most telling Ferns for the conservatory, as it is later on for the rockery and shaded nook outside.

A. pentadactylon—pent-ad-ac′-tyl-on (five-fingered). A variety of the well-known *A. trapeziforme.*

A. peruvianum—per-u-vĭ-a′-num (Peruvian), *Klotzsch.*

This very fine and well-marked, Peruvian, stove species, which by the size and shape of its pinnules (leafits) is readily distinguished from all others, is undoubtedly one of the most ornamental of all the known large-growing Maidenhairs. Its ample and gracefully-pendent fronds, which are produced from a thick, underground, running rhizome (prostrate stem), are borne on stout, upright, black, polished stipes (stalks) 9in. to 18in. long and of a very wiry nature. Their leafy portion grows to a length of from 2ft. to 3ft., and is almost triangular in outline and elegantly arched. These fronds are simply pinnate (once divided to the midrib) on two-thirds of their total length, but they usually have at the base from one to three branches, some of which are occasionally again slightly divided. The pinnules are 2in. or more broad, 1½in. deep, unequally ovate (irregularly egg-shaped) in form, wedge-shaped at the base, and finely toothed and lobed round the upper and outer edges. When mature, these pinnules, which are borne on short though perfectly distinct footstalks, are of a beautiful dark green colour, contrasting most agreeably with the soft metallic hue of the fronds in course of development and the pale green tint of those newly expanded. The sori (spore masses), somewhat varying in length but usually oblong in form, are disposed in interrupted patches along the whole of the anterior margins of the fertile pinnules. See Plate (for which we are indebted to Messrs. J. Veitch and Sons).—*Hooker, Species Filicum*, ii., p. 35, t. 81c. *Nicholson, Dictionary of Gardening*, i., p. 27.

A. Phyllitidis—Phyl-li′-tid-is (Phyllitis-like), *J. Smith.*

This stove species, native of Guiana and Eastern Peru, somewhat resembles *A. lucidum*, but the pinnæ (leaflets) are fewer in number, broader, and of a thicker and more leathery texture. Its fronds, borne on upright, nearly black, polished, strong stalks 6in. to 12in. long, are about 1ft. long and 3in. to 6in. broad, simply pinnate (only once divided to the midrib), furnished with a large terminal lobe and from one to six pinnæ on each side, or the lower pair again branched below. These pinnæ are very nearly entire (uncut), about 3in. long and 1½in. broad, egg-shaped, rounded and stalked at their base. The sori (spore masses) are, as in *A. lucidum*, disposed in a continuous line along both margins of the fertile pinnæ.—*Hooker, Species Filicum*, ii., p. 5, t. 72B.

A. polyphyllum—pol-yph-yl′-lum (many-leaved), *Willdenow.*

This noble, stove Fern is a native of Columbia and Peru; it is equally well adapted for planting in the tropical Fernery or for growing as a pot plant for decoration or exhibition, and is certainly one of the finest of its tribe. Unfortunately, besides the above specific name, it is also known as *A. macrocladum* of Klotzsch and *A. cardiochlœna* of Kunze; and it is generally under the latter appellation that one meets with it in the trade as well as in private collections. Under whatever name it may be grown, it well deserves special attention. Its robust fronds, which frequently attain 4ft. in length and 1ft. to 1½ft. in breadth, are borne on strong, upright, stiff, blackish stalks, rather scabrous (rough) in their lower part, polished above, and 1ft. to 1½ft. long. These fronds, which are produced from a very thick, underground, creeping rhizome (prostrate stem), are copiously branched, being three or more times divided; their upper part is simply pinnate (only once divided to the midrib), while their lower pinnæ (leaflets), sometimes 1ft. long and 6in. broad, are furnished with a long terminal pinna and very numerous pinnules (leafits), sometimes as many as fifty being counted on a single pinna: these leafits are closely set, sub-sessile (almost stalkless), about 1in. long and ¼in. deep, dimidiate (fully developed on one side and scarcely at all on the other), with nearly parallel edges, their upper point blunt, and their upper edge sharply toothed. The numerous kidney-shaped spore masses in this, probably the most gigantic species of the whole genus, are disposed in sub-orbicular (nearly circular) patches placed in hollows in lobes along the upper edge of the fertile pinnules. The plant is equally attractive through the colour of its foliage, which is distinct from most, if not from all, Adiantums; for while in a young state, and when only partly developed, the pinnules are of a most delicate pinkish tint: they gradually become of a metallic colour, which they retain for a long time, and even when fully developed they assume a peculiarly pale, fresh green, uncommon among Ferns in general and among Adiantums in particular.—*Hooker*, *Species Filicum*, ii., p. 49. *Nicholson*, *Dictionary of Gardening*, i., p. 27.

A. populifolium—po-pul-if-ol′-ĭ-um (Poplar-leaved). Synonymous with *A. Seemannii.*

A. princeps—prin′-ceps (princely), *Moore.*

A magnificent, stove species, native of New Granada, with fronds 1ft. to 2ft. long and 9in. to 18in. across the base, rising from a central tufted crown and borne on stout, black, shining, nearly upright stalks 9in. to 12in. long and very wiry. These fronds are quadripinnate (four times divided to the midrib), and occupy on the plant a horizontal position which distinguishes this species from all others in cultivation. Their lower pinnæ (leaflets) are triangular in shape, and have their posterior side three times divided to the midrib, while their anterior side is only bipinnate (twice divided to the midrib). The pinnules (leafits) are 1in. long and ¾in. broad, roundish and shortly stalked ; the one at the end of the pinnæ is larger, wedge-shaped at the base, and fan-shaped at the summit : all of them have their basal margin entire (uncut), slightly concave, the anterior margins and apex (point) divided into broad and shallow lobes, minutely serrulate (finely dented) in the sterile parts, and where fertile bearing each a sorus (spore mass) at their extremity, which gives the lobes a two-horned appearance. Not only does this plant possess an unusual degree of boldness of character on account of the size of the fronds and of their pinnules, but it is also remarkably graceful from its fulness of development and from the pendent, or at least horizontal, position which its pale, greyish-green fronds assume when fully developed. It is a species whose roots are of a remarkably brittle nature, and one cannot be too careful, when repotting it, in touching the roots no more than is strictly necessary.—*Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. prionophyllum—prĭ-o-noph-yl′-lum (saw-leaved). A synonym of *A. tetraphyllum.*

A. pubescens—pu-bes′-cens (downy), *Schkuhr.*

This greenhouse Fern, native of New Zealand and Australia, though given in the "Synopsis Filicum" as simply synonymous with *A. hispidulum*, is, from a decorative point of view, sufficiently distinct to be separated from it. Lowe, who gives an excellent illustration of *A. pubescens*, as well as one of *A. hispidulum* showing a most distinct form of growth and habit, rightly says, "This Fern has been correctly named *pubescens:* indeed it is as pubescent as it is possible for a Fern to be, the stem being quite rough with the vast number of short brown hairs with which it is entirely covered." *A. pubescens* is of much larger dimensions than *A. hispidulum* as usually seen, the pinnules (leafits) being much larger, deep green, bluntly oblong, wedge-shaped at the base, with their margin slightly dented. The fronds are nearly all fertile, from 1ft. to 1½ft. long, produced from a tufted central crown, and are very persistent. The kidney-shaped and hairy sori (spore masses) are small, and are disposed from twelve to sixteen to a pinnule, along the upper and outer edges only.—*Lowe, Ferns British and Exotic*, iii., t. 9.

A. pulchellum—pul-chel′-lum (neat), *Blume.*

A stove species, also known under the name of *A. Lobbianum*, native of Java. It somewhat resembles *A. fulvum* in habit and texture of the foliage, which, however, attains larger dimensions and is of a more hairy nature. The fronds, borne on upright, nearly black, hairy stalks 6in. to 12in. long, are 1ft. or more each way and consist of a terminal central leaflet 6in. to 9in. long and 1½in. broad, and a few large, spreading lateral ones on each side, the lower ones being branched again with two to four spreading branches. The pinnules (leafits) are similar in shape to those of the popular *A. fulvum*, and the numerous small, roundish sori (spore masses) are disposed on their upper edge.—*Hooker*, *Species Filicum*, ii., p. 38.

A. pulverulentum—pul-ver-ul-en′-tum (dusty), *Linnæus.*

A stove species, native of the West Indian Islands, of robust constitution and easy culture. Its fronds, which are borne on stiff, upright, blackish stipes (stalks) 6in. to 12in. long and so covered with short hairs of a rusty colour as to be quite rough, are produced from a thick, slowly-creeping, underground rhizome (prostrate stem). They consist of a central terminal pinna (leaflet) and several spreading lateral ones on each side, all of which, except those at the base of the fronds, are 4in. to 8in. long and 1in. broad. The numerous pinnules (leafits), of a brilliant metallic hue when in a young state but of a dull green colour when mature, are set close together and become gradually smaller as they approach the point of the frond. They are of a sub-coriaceous (almost leathery) texture, and have their upper and outer edges finely toothed. The sori (spore masses) are disposed in a narrow, continuous line, which generally occupies only about two-thirds of the upper margin.—*Hooker*, *Species Filicum*, ii. p. 17. *Nicholson*, *Dictionary of Gardening*, i., p. 28. *Lowe*, *Ferns British and Exotic*, iii., t. 17.

A. pumilum—pu′-mil-um (dwarfish), *Swartz.*

A stove species, hardly 3in. high, and of no decorative value. It is a native of Jamaica.—*Hooker*, *Species Filicum*, ii., p. 15.

A. ramulosum—ra-mul-o′-sum (full of small branches). A variety of *A. Capillus-Veneris.*

A. reginæ—re-gi′-næ (queenly), *Moore.*

This is one of the most distinct, and undoubtedly the most decorative, of a series of seedlings or supposed hybrids of garden origin, comprising the better-known *A. rhodophyllum*, *A. Victoriæ*, &c. The general appearance of all these warrants the assumption that they are issue from *A. Ghiesbreghtii* (*A. scutum* of commerce) ; but they essentially differ in the colour of their young growths and in their habit, which latter in all cases is dwarfer and much more compact. In the case of *A. reginæ*, the fronds, though much shorter and borne on slender, black, shining stalks, are broader and of a much more leathery texture: the plant is characterised by its dense habit, its elegant contour, and its large, remarkably firm pinnules (leafits), which are of a most pleasing, soft green colour. The sori (spore masses) are sparingly produced, of oblong shape, and disposed in an interrupted row around the outer margin, one or sometimes two to each lobe.

A. Reichenbachii—Reich-en-bach′-ĭ-i (Reichenbach's). Synonymous with *A. Henslovianum.*

A. reniforme—re-nif-or′-mĕ (kidney-shaped), *Linnæus.*

This very interesting and exceedingly distinct, greenhouse species, which in the shape of its fronds differs from all other Ferns contained in the genus, has a very limited geographical range, for it is not known to have been gathered in a wild state in any other places than Madeira, Teneriffe, and the Azores. It is an evergreen Fern of comparatively small dimensions, having as little as possible the appearance of an Adiantum ; but its great distinctness alone is sufficient to make it indispensable in any collection. Its singular, leathery fronds, which are abundantly produced from a close, tufted crown and borne on slender, shining stipes (stalks) of a particularly bright chestnut-brown colour, 4in. to 6in. long, are essentially reniform (kidney-shaped) ; they are of a brilliant shining-green colour, smooth, when fully developed frequently 1½in. across, and their leafy portion is, at the point of junction with the stalk, provided with a broad, shallow depression (Fig. 47). The venation of the fronds is very delicate, conspicuous, and interesting, the main veins which start from the basal depression being dichotomous (repeatedly forked) until they reach the outer margin, by which time they have been four times forked. The oblong sori (spore masses) are produced abundantly, and are disposed in a continuous row all around the margin.—*Hooker*, *Species Filicum*, ii., p. 2, t. 71A. *Nicholson*, *Dictionary of Gardening*, i., p. 28. *Lowe*, *Ferns British and Exotic*, iii., t. 2B.

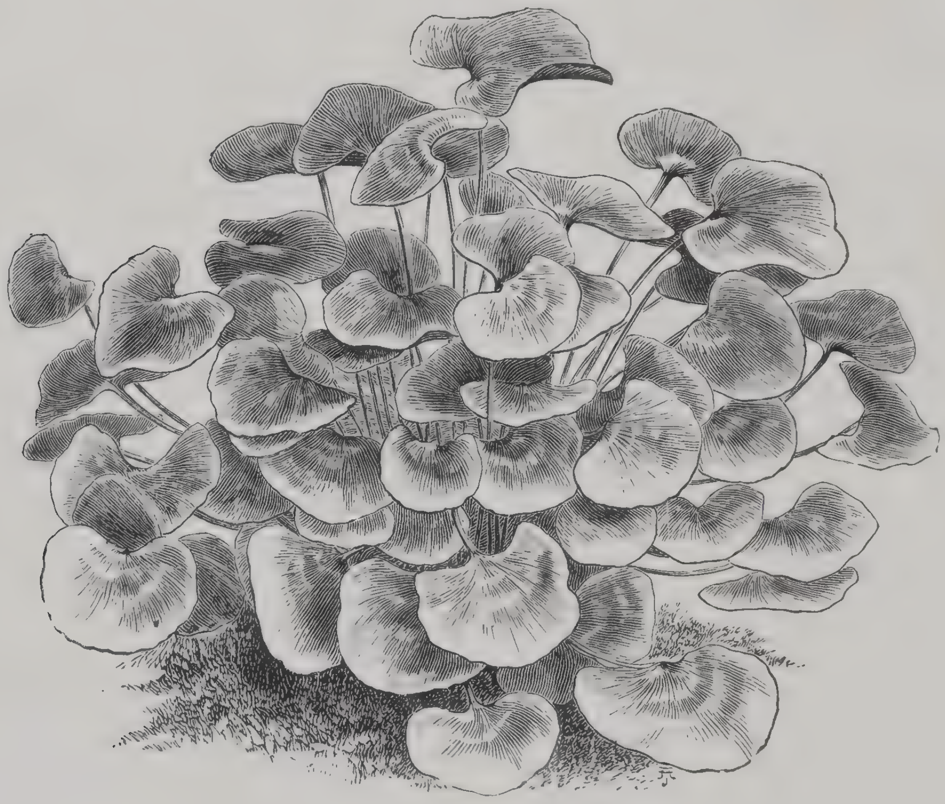


Fig. 47. Adiantum reniforme
(½ nat. size).

This lovely species is by most growers considered difficult to manage, but it is generally when kept in too warm a house or when potted in too loamy a soil that it gives any trouble. To be grown successfully it only requires greenhouse treatment, and it thrives best in a mixture of two parts peat, one part fibrous loam, and one part coarse silver sand (or, when procurable, one part of old lime rubbish, of which its roots are very fond).

A. r. asarifolium—as-ar-if-ol′-ĭ-um (Asarum-leaved), *Willdenow.*

Although some authorities consider this Fern, which is very scarce, as identical with *A. reniforme*, and make simply a variety of it, the distinguishing characters which it possesses are apparently of sufficient consequence to entitle it to the rank of species. Sir William Hooker, for instance, thinks that it is a different plant, and he justly remarks that "*A. reniforme* is more slender, has long, flexible stipes (stalks), is less scaly; its fronds are smaller and of thinner texture, and they have less densely approximated involucres," which means that the indusia (coverings of their spore masses) are not set so closely together. For the same reasons Willdenow also considers the two plants as distinct species. These reasons, however, have not proved sufficient to the authors of the "Synopsis Filicum," who have retained *asarifolium* as a variety of *A. reniforme*. *A. r. asarifolium* has an equally restricted geographical range, as it is only known to occur in a wild state in the Mauritius and Bourbon Islands. Whether species or variety, the general appearance of the plant is somewhat near that of the species from which it is supposed to have originated, but it is always stouter and coarser, and its fronds, instead of being truly kidney-shaped, are orbicular (quite round) and of a much thicker texture: they usually measure 2½in. across and are produced from a stout, single crown, the stalks and the base of the frond itself being very woolly. Lowe, in his splendid work, "Ferns British and Exotic," vol. iii., p. 8, says that "Petiver describes a third very similar plant, said to have been found in the Philippine Islands, and which he has called *A. philippinense*"; but other botanists having failed in their search for Petiver's plant, and the numerous plant collectors who have searched for new plants all over these Islands having equally failed, its existence may be considered as very doubtful.—*Hooker*, *Species Filicum*, ii., p. 2, t. 71B. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. rhodophyllum—rhod-oph-yl′-lum (rose-fronded), *Moore.*

This beautiful, stove Fern, of dwarf and compact habit, is a supposed hybrid of garden origin: it has the appearance of having issued from *A. Ghiesbreghtii* (*A. scutum* of commerce), to which it is far superior in its ornamental qualities. The fronds, which are abundantly produced from a densely-tufted crown and borne on very slender, black, shining stipes (stalks), have their leafy portion about 1ft. long, triangular in shape, tripinnate (three times divided to the midrib), and elegantly spreading. The pinnules (leafits), borne on short, hair-like, black footstalks, are nearly fan-shaped, 1in. to 1½in. across, truncate (terminating abruptly) on the basal side, very finely dentate and split on the outer margin: when first developed they are of a beautiful rosy-purple tint; this gradually changes to a soft, pale green colour, which they assume when mature. The sori (spore masses) are sparingly produced, oblong in form, and disposed singly at the extremities of the lobes on the outer or superior margin only. The remarkable diversity of colours presented by the pinnules at different stages of their growth, and which are all to be seen on the plant at the same time, renders this Adiantum one of the most effective decorative Ferns in cultivation. To this striking characteristic must also be added its compact habit and the elegant contour of its tufted fronds. All these characters are faithfully reproduced in young plants obtained from spores. For the Plate illustrating this plant and *A. deflexum*, we are indebted to Messrs. J. Veitch and Sons.—*Nicholson*, *Dictionary of Gardening*, iv., p. 485.

A. rhomboideum—rhom-boid′-ĕ-um (rhomboid). A South American Fern identical with the West Indian *A. villosum.*

A. rigidulum—rig-id′-ul-um (somewhat stiff), *Mettenius.*

A stove species, of small dimensions and of little decorative value, with fronds of a glaucous (bluish-green) or whitish colour on both surfaces; native of the West Indies.—*Hooker*, *Synopsis Filicum*, p. 474.

A. roseum—ros′-ĕ-um (rosy), *Backhouse.*

A greenhouse Fern, of dwarf habit, whose fronds, scarcely 5in. long, are of a lovely pinkish tint when young. It is of garden origin.—*Nicholson*, *Dictionary of Gardening*, iv., p. 485.

A. rotundatum—rot-un-da′-tum (rounded). A variety of *A. Capillus-Veneris.*

A. rubellum—rub-el′-lum (reddish), *Moore.*

This very pretty, stove species, closely allied to and intermediate between *A. Wagneri* (*A. decorum* of commerce) and *A. tinctum*, is a native of the Andes of Bolivia: it is of dwarf but elegant habit. The fronds, which are abundantly produced from a close, tufted crown, and borne on exceedingly slender, black, shining stipes (stalks) 4in. to 6in. long, have their leafy portion of similar length; they are deltoid (in form of the Greek delta, Δ) and bipinnate (twice divided to the midrib). The numerous pinnules (leafits) are fan-shaped at their summit, wedge-shaped at their base, and their outer margin is lobed and finely toothed: they are sub-sessile (almost stalkless), and when young are of a beautiful purplish-crimson, changing with age to a light glaucous (bluish-green) tint, but even then tinged with pink; so that a good specimen is always more or less enlivened by a roseate hue. The sori (spore masses) are round or slightly kidney-shaped, and are disposed singly in the tips of the lobes. See Plate (for which we are indebted to Messrs. J. Veitch and Sons).—*Hooker*, *Synopsis Filicum*, p. 474. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. Sanctæ-Catherinæ—Sanc′-tæ–Cath-er-i′-næ (from Santa Catherina). A variety of *A. trapeziforme.*

A. scabrum—scab′-rum (rough). A variety of *A. æthiopicum.*

A. schizophyllum—schiz-oph-yl′-lum (cut-leaved). A variety of *A. cuneatum.*

A. scutum—scu′-tum (shield). A popular name for *A. Ghiesbreghtii.*

A. Seemannii—See-mann′-ĭ-i (Seemann's), *Hooker.*

This very handsome and totally distinct, stove species, also known under the names of *A. populifolium* and *A. Zahnii*, is a native of Guatemala and Brazil; it is of very peculiar growth, inasmuch as while in a young state the plant only produces simple (undivided) fronds of extraordinary dimensions, which are then heart-shaped, with an elongated point, and often measure as much as 3in. in breadth: they are produced from a thick, underground rhizome (prostrate stem), and are borne on upright, black, shining stipes (stalks) 6in. to 9in. long. With maturity the fronds become pinnate (once divided to the midrib), the lower pair of pinnæ (leaflets) being occasionally divided again; their pinnæ, which are larger than even those of the popular *A. macrophyllum* and have black, polished footstalks often 1in. long, are then ovate (egg-shaped), acuminate (terminating in a sharp point), unequal-sided, and drooping at right angles from the stalk. The barren pinnæ are usually finely dented, while the fertile ones show on their outer margin an uninterrupted line of oblong sori (spore masses). The foliage, of a particularly leathery texture, is, when only partly developed, of a bronzy or metallic hue, turning with age to a deep glossy-green above, while the under-surface assumes a very pretty glaucous (bluish-green) or bluish colour, which is retained as long as the fronds last. See Plate (for which we are indebted to Messrs. J. Veitch and Sons).—*Hooker*, *Species Filicum*, ii., p. 5, t. 81A. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. sericeum—se-ric′-ĕ-um (silky), *Eaton.*

A stove species, native of Cuba, of little decorative value, but interesting on account of the stalks which support its spear-shaped, bipinnate (twice divided) fronds, being densely clothed with fine, spreading hairs of a light brown colour.—*Hooker*, *Synopsis Filicum*, p. 473.

A. serratodentatum—ser-ra′-to-den-ta′-tum (saw-toothed). Apparently synonymous with *A. obtusum.*

A. sessilifolium — ses-sil-if-ol′-ĭ-um (stalkless). This is synonymous with *A. Henslovianum.*

A. setulosum—se-tul-o′-sum (bristly). A synonym of *A. diaphanum.*

A. Shepherdi—Shep-herd′-i (Shepherd's), *Hooker.*

This very curious, stove species, native of Mexico, is somewhat similar to *A. Galeottianum*, but the stalk is quite simple, the form of the pinnæ (leaflets) quite different, and the habit peculiar. The fronds are 6in. to 12in. long and simply pinnate (only once divided to the midrib), and are borne on black, shining, upright stalks 3in. to 4in. long. The pinnæ, ¾in. broad and ¼in. deep, are dimidiate (fully developed on one side of the midrib and scarcely at all on the other); their lower line is nearly straight, the upper line is rounded, and, like the two bluntly-rounded sides, broadly lobed: they are stalkless, and usually reflexed, so that the pinnæ of the opposite sides of the stalk are brought face to face, the inner quarter of the blade being imbricated (overlapping the stalk). The foliage is of a sub-coriaceous (almost leathery) texture, and the sori (spore masses), which are kidney-shaped and as deep as broad, are situated in distinct hollows around the outer edge.—*Hooker*, *Species Filicum*, ii., p. 9, t. 73B.

A. sinuosum—sin-u-o′-sum (wavy), *Gardner.*

This stove species, native of Brazil, although existing in herbaria, is unknown in European gardens, where its introduction would be most welcome on account of the peculiar shape of its pinnules (leafits): these are about half-way between those of the flabellato-cuneate (fan- and wedge-shaped) type, of which *A. Capillus-Veneris* is a good illustration, and those of form that is truly dimidiate (fully developed on one side of the midrib and scarcely at all on the other), as in *A. trapeziforme*, so that its position may be said to be intermediate between these two species. The fronds, borne on upright, nearly black, shining stalks 4in. to 8in. long, consist of a long, terminal, central pinna (leaflet) 2in. to 3in. broad and one or two pairs of spreading branches at the base. The pinnules, besides being peculiarly shaped, have their upper margin deeply lobed, the lobes being again crenate (notched). The obreniform (reversed kidney-shaped) spore masses are disposed in rounded sinuses (depressions) on the notches of the lobes.—*Hooker*, *Species Filicum*, ii., p. 35.

A. speciosum—spec-ĭ-o′-sum (showy). Synonymous with *A. digitatum.*

A. strictum—stric′-tum (upright). A variety of *A. cuneatum.*

A. subcordatum—sub-cor-da′-tum (almost heart-shaped), *Swartz.*

This stove species, native of Guiana and Brazil, resembles the popular *A. trapeziforme* as regards general habit and dimensions, for its fronds, borne on upright, stout, blackish, shining stipes (stalks) 6in. to 12in. long, are fully 2ft. long and 1ft. broad, tripinnate (thrice divided to the midrib), with their lower pinnæ (leaflets) 1ft. long and 6in. to 9in. broad. But *A. subcordatum* differs essentially from the species above mentioned through the shape of its soft, papery pinnules (leafits), which are 2in. long and 1in. broad, ovate-acuminate (egg-shaped, but terminating in a sharp point), and slightly oblique at the base on the lower side: they are borne on slender footstalks ¼in. to ½in. long, and are also slightly lobed on their lower side. The sori (spore masses) in this species are disposed in roundish or oblong patches along both sides of the pinnules.—*Hooker*, *Species Filicum*, ii., p. 34.

A. subvolubile—sub-vol-u′-bil-ĕ (nearly twining), *Mettenius.*

This singular, stove species, of sub-scandent (almost climbing) habit, is a native of the Andes of East Peru. Its curious fronds, borne on slender, shining stalks, which when they reach the leafy portion assume a peculiar zigzag habit, consist of central lanceolate (spear-shaped) pinnæ (leaflets) and a few short, spreading pinnules (leafits) of a membranous (thin and filmy) texture and bright green colour. The lateral or side pinnules have their lower edge in a line with their footstalk, their inner edge touching or wrapped over the stalk, and their outer edge showing shallow lobes: the lowest pinnules are much wrapped over the stalk. The spore masses are small, round, and disposed from six to twelve to each fertile pinnule.—*Hooker*, *Synopsis Filicum*, p. 473.

A. sulphureum — sul-phur′-ĕ-um (sulphur-yellow). This is a variety of *A. æthiopicum.*

A. tenerum—ten′-er-um (tender), *Swartz.*

This very fine, evergreen, stove species, of large dimensions and elegant habit, has a very wide geographical range of habitat, for, while in the "Synopsis Filicum" it is given as a native of Mexico and the West Indian Islands southward to Juan Fernandez and Peru, Eaton, in his splendid work on the "Ferns of North America," states that *A. tenerum*, or "Brittle Maidenhair" as it is commonly called in America, grows on the banks of Halifax River, Florida, and also near Ocala, Florida, where it is found wild in abundance on sides of "sinks" in limestone; and adds that it is a common Fern in the West Indies, Bermuda, Mexico, Venezuela, and some parts of South America. Under cultivation this species is a general favourite wherever Ferns are in requisition for decorative purposes: its beautiful fronds, which are abundantly produced from a slowly-creeping, underground rhizome (prostrate stem) about as thick as a goose-quill and covered with dark brown hairs and dented scales of the same colour, grow from 3ft. to 4ft. in length, nearly one-third of which is naked. These fronds, of a very elegant character, are tri- or quadripinnate (three or four times divided to the midrib) and 1ft. to 1½ft. broad. The ebeneous-black and glossy character of the stipes (stalks) extends to the footstalks of the numerous pinnules (leafits), and this produces a great and pleasing contrast to the brilliant green of the latter. These leafits are all borne on short footstalks, from which they readily fall when dry: their upper edge is rounded, broadly and often also deeply lobed; the barren lobes are finely dented, and the fertile ones are entire. The sori (spore masses) are kidney-shaped, and disposed from ten to thirteen in roundish or transversely-oblong patches in the lobes of the upper margin of each fertile pinnule. This species makes a grand specimen for exhibition purposes where sufficient room is allowed to it.—*Hooker*, *Species Filicum*, ii., p. 45. *Nicholson*, *Dictionary of Gardening*, i., p. 28. *Lowe*, *Ferns British and Exotic*, iii., t. 10. *Eaton*, *Ferns of North America*, ii., t. 77.

A. t. Farleyense—Far-ley-en′-sĕ (from Farley).

For reasons previously stated, this magnificent Adiantum, although given in the "Synopsis Filicum" as a variety of the foregoing species, has been described under the name of *A. Farleyense*, by which it is nearly always known.

A. tetragonum—tet-rag-o′-num (having four angles), *Schrader*.

A stove species, native of Brazil, with fronds pedato-tripinnate (three times divided to the midrib, but of bird's-foot form), 1ft. long and 1½ft. broad, which are borne on slightly hairy stipes (stalks) 1ft. or more long. The terminal pinnæ (leaflets) are spear-shaped, 6in. to 9in. long and 5in. to 6in. broad; while their pinnules (leafits), of a deep green colour and equally spear-shaped, 2½in. to 3in. long, are slightly lobed, rounded on their upper side, and cuneate-truncate (terminating abruptly in a wedge-shape) on their lower side at the base. The sori (spore masses) are short, very narrow, and disposed at the tips of the lobes all down both sides.—*Hooker*, *Synopsis Filicum*, p. 475.

A. tetraphyllum—tet-raph-yl′-lum (four-leaved), *Willdenow.*

This handsome, but very variable, stove species, also known under the name of *A. prionophyllum*, is a native of Tropical America, where it is found from Mexico and the West Indies southward to Brazil. Its massive yet elegant fronds, borne on strong, upright, downy stalks rising from a slowly-creeping, underground rhizome (prostrate stem), are of a very peculiar shape. They consist of a long terminal pinna (leaflet) 6in. to 9in. long and 1in. to 1½in. broad, and of numerous spreading lateral ones nearly as large on both sides; consequently, the leafy portion of the frond is frequently 1½ft. long and almost as much broad. The pinnules (leafits) are of a leathery texture, ½in. to ¾in. broad and ¼in. deep, sub-dimidiate (being nearly fully developed on one side of the midrib and not at all on the other), their lower line straight or somewhat decurved, the upper line nearly parallel, finely toothed, and the outer edge very oblique. The sori (spore masses), usually of oblong form, sometimes kidney-shaped, are disposed in broken lines round the upper and outer margin.—*Hooker*, *Species Filicum*, ii., p. 21. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. t. acuminatum—ac-u′-min-a′-tum (taper-pointed), *Moore.*

The long, narrow-pointed shape of the pinnæ (leaflets), peculiar to this garden variety, distinguishes it from the species to which it undoubtedly belongs. The pale green colour of the mature foliage is remarkably pretty, and the tapering termination of the fronds and of their pinnæ gives the plant a particularly elegant appearance. It is of similar dimensions to, and has the same habit of growth as, the original *A. tetraphyllum.* See Coloured Plate.

A. t. gracile—grac′-il-ĕ (slender), *Moore.*

A close-growing variety, introduced from Tropical America, having fronds similarly produced from an underground, slowly-creeping rhizome (prostrate stem) and borne on slender black stalks of a downy nature; but these fronds are much shorter than those of the species itself, are elegantly arching, bipinnate (twice divided to the midrib), and furnished with numerous pinnules (leafits) of the same shape as those of the typical plant but of smaller dimensions. See Plate (for which we are indebted to

Messrs. W. and J. Birkenhead). This is a very distinct and specially striking Fern, remarkable for the beautiful reddish hue assumed by its fronds when first developed, and which they retain until they are fully expanded.

A. t. Hendersonii—Hen-der-so′-nĭ-i (Henderson's), *Linden.*

This variety, which is of much stronger constitution than *A. t. gracile*, differs from the typical plant principally through the blunt character of the small pinnules (leafits) with which its fronds, 1½ft. to 2ft. long, are abundantly furnished. It also differs from the variety *gracile* in the rich bronzy or metallic colour of its foliage and in its robust growth, the fronds being of a semi-drooping character, which gives the plant a very graceful appearance.—*Nicholson, Dictionary of Gardening*, i., p. 28. *Linden, Illustration Horticole*, xx., t. 127.

A. tinctum—tinc′-tum (tinted), *Moore.*

This pretty, dwarf species, which thrives equally well in greenhouse or in stove temperature, is a native of the Andes of Peru. It is intermediate between *A. rubellum* and *A. Wagneri* (*A. decorum* of commerce), but its elegant fronds, 6in. to 9in. long, borne on slender, black stalks 4in. to 6in. long, and produced in profusion from a central, tufted crown, are less divided than those of the latter species. They are also much narrower, bipinnate (twice divided to the midrib), and their lower pinnules (leafits) are closely wrapped over the stalk. When in a young state the pinnules are of a delicate rosy-red tint, and they change with age to a bright green colour. This species is also the smallest of the known Adiantums with coloured foliage.—*Hooker, Synopsis Filicum*, p. 474. *Nicholson, Dictionary of Gardening*, i., p. 28.

A. trapeziforme—trap-e-zif-or′-mĕ (rhomb-shaped), *Linnæus.*

This well-known, delicate-looking, yet bold-growing, stove species, much appreciated by the floral decorator as well as by the collector, is a native of Tropical America, and its geographical range extends from Mexico and the West Indies southward to Brazil. Its handsome fronds, which are produced from a slowly-creeping, underground rhizome (prostrate stem) and borne on firm, upright, black, shining stipes (stalks) 6in. to 12in. long and furnished near their base with a few narrow scales, vary in length from 1½ft. to 2½ft. They consist of a central pinna (leaflet) 6in. to 9in. long and 2in. to 3in. broad, and three or four large, spreading ones on each side, the lowest of which are frequently branched again. The pinnules (leafits) are of papery texture and of a brilliant green colour, 1½in. to 2in. long, ½in. to ¾in. broad, dimidiate (having one side of the midrib fully developed and the other scarcely developed at all), and have their sides nearly parallel, the outer and the upper edges being bluntly lobed. The sori (spore masses) are oblong in form, large, prominent, and numerous, and are disposed close together round the upper and outer edges of the fertile pinnules. This Fern is readily distinguished from all others by its peculiar-shaped pinnules (see Plate); it is also a free grower, which quality no doubt accounts for its popularity. Like *A. tetraphyllum*, *A. trapeziforme* is very variable, and several handsome varieties of it are known to be in cultivation.—*Hooker*, *Species Filicum*, ii., p. 33. *Nicholson*, *Dictionary of Gardening*, i., p. 28. *Lowe*, *Ferns British and Exotic*, iii., t. 3.

A. t. cultratum—cul-tra′-tum (knife-like), *J. Smith.*

In this variety, of Brazilian origin, the leafy portion of the fronds, which attain dimensions similar to those of the species, has a much less dense appearance owing to the peculiar character of the pinnules (leafits), which have their outer edge bluntly rounded. It also materially differs from the type in the colour of its foliage, which when young is of a metallic hue, turning with age to a dark green colour.—*Hooker*, *Species Filicum*, ii., p. 34. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

When planted in the warm rockery and sufficient space is allowed for its development, this Fern makes a noble specimen, as its foliage is very persistent.

A. t. pentadactylon—pent-ad-ac′-tyl-on (five-fingered), *Langsdorff and Fischer.*

This variety, also of Brazilian origin, differs from the species by its more bushy habit and by the colour of its foliage, which is of a peculiar dark green when mature, but when only partly developed is of a fine metallic or bronzy hue. It differs from the foregoing variety in the shape of its pinnules (leafits), which have their lower margin somewhat obliquely decurved from the stalks. — *Hooker*, *Synopsis Filicum*, p. 118. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

This variety also makes a very handsome specimen when planted out. It requires all the year round a particularly liberal supply of water at the roots.

A. t. Sanctæ-Catherinæ—Sanc′-tæ–Cath-er-i′-næ (from Santa Catherina). This is a garden name—having no responsible author—for another very ornamental Brazilian form of much dwarfer and more compact habit than the species. Its deeply-cut fronds, which seldom exceed 2ft. in height including the wiry, black, shining stalks upon which they are borne, are very freely produced from an underground, creeping rhizome (prostrate stem), which possesses the property of producing numerous ramifications. The pinnules (leafits) are set rather far apart, coarsely toothed (Fig. 48), of a dark green

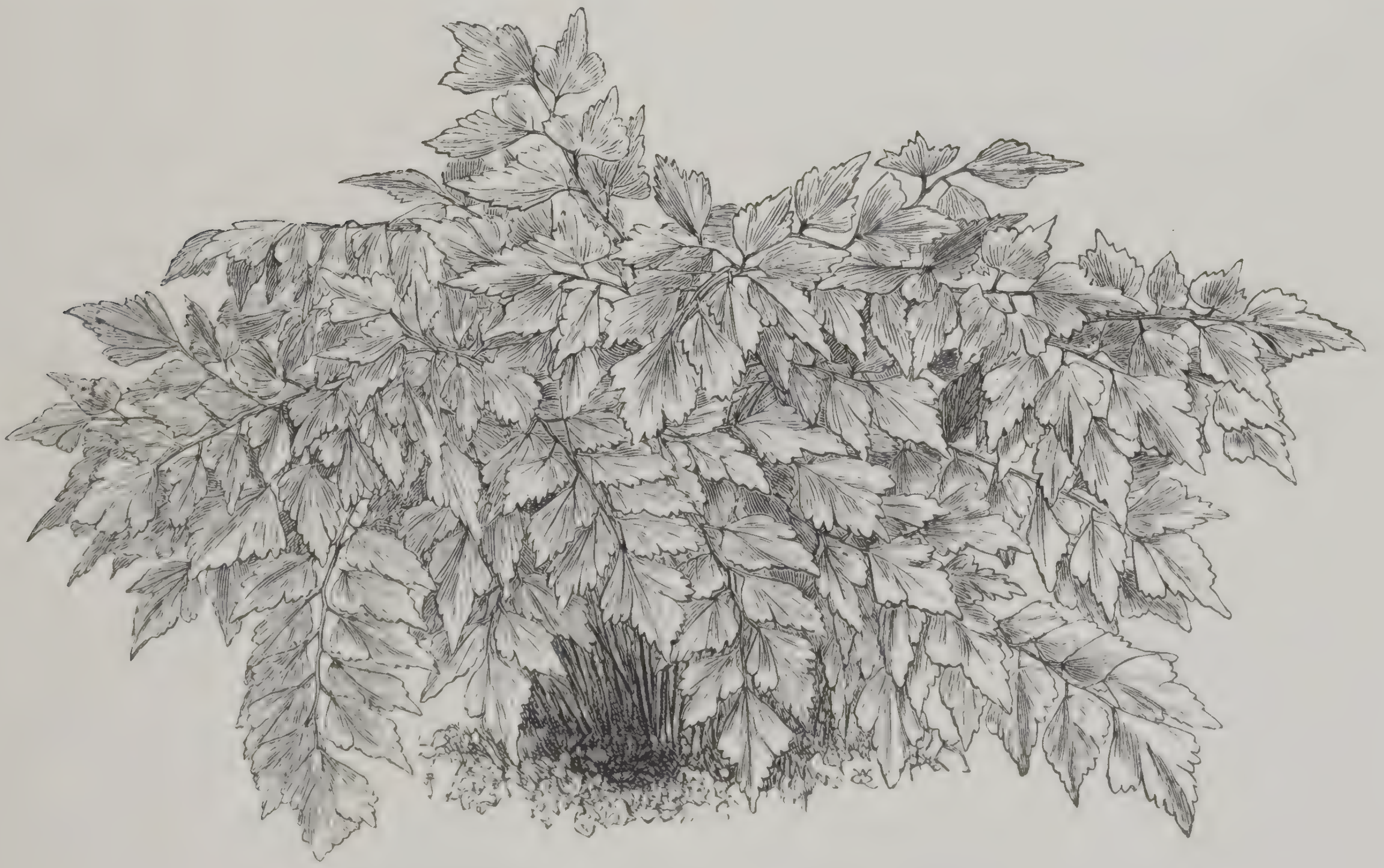


Fig. 48. Adiantum trapeziforme Sanctæ-Catherinæ
(⅙ nat. size).

colour when mature, and of a metallic tint when in a young state.—*Nicholson, Dictionary of Gardening*, i., p. 28.

A place with a smaller amount of light than is required by other varieties of the same species, suits this plant admirably.

A. t. S.-C. Funckii—Funck′-ĭ-i (Funck's).

A garden sub-variety of *Sanctæ-Catherinæ*, from which it differs only in the more drooping habit of its fronds, the pinnules (leafits) of which are more deeply lobed.—*Nicholson, Dictionary of Gardening*, i., p. 28.

A. triangulatum—trĭ-ang-ul-a′-tum (triangular-leaved). Synonymous with *A. intermedium.*

A. undulatum—un-dul-a′-tum (wavy). A variety of *A. Capillus-Veneris.*

A. varium—var′-ĭ-um (variable). Probably identical with *A. villosum.*

A. Veitchianum—Veitch-ĭ-a′-num (Veitch's), *Moore.*

This very distinct and elegant, stove species, no doubt the most highly-coloured as well as the largest-foliaged of the known tinted Adiantums (with the exception of *A. macrophyllum*), is a native of the Andes of Peru. Its very attractive fronds, abundantly produced from a slender, underground rhizome (prostrate stem), and borne on thin, wiry, black, shining stalks 4in. to 6in. long, are from 8in. to 12in. long, deltoid (in the shape of the Greek delta, Δ), and bipinnate (twice divided to the midrib) in their lower half. They are particularly upright, and are furnished with numerous pinnules (leafits) about ½in. broad, semicircular on their upper margin, where they are also shallowly lobed. The round and small sori (spore masses) are disposed about eight along the upper margin of the fertile pinnules. The pinnules are of a remarkably bright red tint in their young state, and with age change to a soft pale green: they are also of a thicker texture than most Adiantums of the same section.—*Hooker, Synopsis Filicum*, p. 473. *Nicholson, Dictionary of Gardening*, i., p. 28.

A. velutinum—vel-u-ti′-num (velvety), *Moore.*

This tall, bold-growing, stove species, native of the Andes of Columbia, is readily distinguished by its stipes (stalks), 1ft. to 1½ft. long, which are of a velvety nature. The fronds are 1½ft. to 2ft. long, deltoid (in form like the Greek delta, Δ), and almost erect; their pinnæ (leaflets), 6in. to 9in. long, are copiously furnished with almost stalkless pinnules (leafits) 1in. long and ½in. broad, the lower margin of which is decurved and the upper one straight and bluntly lobed: these pinnules are of a dark green colour on both surfaces. The sori (spore masses) are straight, one to one and a-half lines long, and are situated at the tips of the lobes of the upper edge, from four to six to a pinnule.—*Hooker*, *Synopsis Filicum*, p. 472. *Nicholson*, *Dictionary of Gardening*, i., p. 28.

A. venustum—ven-us′-tum (charming), *Don.*

This very distinct species, of dwarf habit, which thrives best in the cool greenhouse or frame, and is nearly hardy in sheltered places, remains rare in cultivation. Although discovered many years ago by Dr. Hooker on the Himalayas, where it grows at an elevation of 8000ft., it has never been plentiful. According to Beddome, it is found in Simla, Nepaul, Meerut, and Khasya, at an elevation of 6500ft. Its comparative scarcity is no doubt due to the fact that there is another and a totally different plant which is generally and extensively grown as *A. venustum*, and found in most collections as well as in many trade catalogues under that name, but which is only a dwarf form of *A. æthiopicum*, with slender, brittle, straw-coloured stalks and roundish pinnules (leafits) of a very soft light green: this variety is very proliferous, being provided with numerous slender, underground, creeping rhizomes (prostrate stems), from which the young growth springs in profusion. The true *A. venustum* also produces its elegant fronds from a creeping rhizome, but in this latter organ the power of ramification is not much developed: consequently the fronds are produced more sparingly than in the variety just mentioned. The more rigid texture, the numerous small, scarcely-lobed segments (leafits), and the few large sori (spore masses), clearly distinguish the true species from the spurious form, as also from its nearest allies—*A. fragile*, *A. glaucophyllum*, and *A. monochlamys*. Its fronds, 6in. to 12in. long and 4in. to 8in. broad, are borne on wiry, ebony-black, shining stalks 6in. to 9in. long, slender but not brittle: they are deltoid (in form of the Greek delta, Δ) and tri- or quadripinnate (three or four times divided to the midrib). The numerous pinnules, about ¼in. across, are of two very different shapes, the fertile ones being wedge-shaped, with their nearly smooth margins broadly lobed; whereas in the barren ones the cuneate (wedge-shaped) form is not so clearly shown, their upper edge being much more rounded and usually finely dented. The whole of the foliage is of a coriaceous (leathery) texture, and the colour of the upper surface of the fronds is of a bright green, while their under-surface is quite glaucous (bluish-green)—characters which further distinguish it from the spurious form. The large and roundish sori (spore masses) are disposed from one to three in distinct hollows of the upper margin.—*Hooker*, *Species Filicum*, ii., p. 40, t. 96B. *Nicholson*, *Dictionary of Gardening*, i., p. 29. *Beddome*, *Ferns of British India*, t. 20.

A. versaillense—ver-sail-len′-sĕ (from Versailles). A variety of *A. cuneatum.*

A. Victoriæ—Vic-to′-rĭ-æ (Victoria's), *Moore.*

In this pretty, dwarf Maidenhair, of garden origin, and which has all the appearance of a very dwarf form of *A. Farleyense*, the fronds, abundantly produced from a central, tufted crown, are crowded, bipinnate (twice divided to the midrib), and form close, low tufts, 4in. to 6in. high, of rich, bright green foliage. The rather large pinnules (leafits) are peculiarly crisped or undulated, deeply lobed around the upper and outer margins, and the oblong sori (spore masses) are disposed one on the tip of each lobe of the fertile pinnules.—*Nicholson*, *Dictionary of Gardening*, i., p. 29.

A. villosissimum—vil-lo-sis′-sim-um (very hairy), *Mettenius.*

A very singular, stove species, of medium growth, native of Panama. The fronds are 1ft. long, bipinnate (twice divided to the midrib), and furnished with pinnules (leafits) of a parchment-like texture, the surfaces of which are of a dark green colour and densely covered with closely-pressed, slender, reddish hairs: the hairs are also found abundantly on the stalks and on the indusium (covering of the long and narrow spore masses) on the superior margin.—*Hooker*, *Synopsis Filicum*, p. 473.

A. villosum—vil-lo′-sum (hairy-stalked), *Linnæus.*

This is a remarkably distinct, stove species, native of the West Indies, Panama, and Brazil. It is easily recognisable by the line of fructification, which is continued all along the upper and then usually down the oblique outer edge: yet, under the names of *A. falcatum* of Swartz, *A. oblique-truncatum* of Fée, and *A. varium* of Willdenow, as also under the garden appellation of *A. rhomboideum*, several plants in every respect identical with this species are found in collections. *A. villosum* is a robust grower and a very ornamental Fern, whose massive fronds rise from a slowly-creeping, underground rhizome (prostrate stem) of the thickness of a goose-quill and of a decidedly woody nature. They are borne on upright, blackish stalks 9in. to 12in. long and of a downy nature, and consist of a terminal central pinna (leaflet) and several spreading pinnæ on each side 6in. to 12in. long and 1½in. to 2in. broad; these are furnished with pinnules (leafits) of a coriaceous (leathery) texture and of a bright green colour, dimidiate (fully developed on one side of the midrib and scarcely at all on the other), about 1in. long and ½in. broad, their lower line nearly straight, the upper line nearly parallel with it but considerably larger, slightly toothed, and the outer edge auricled (eared) at the base. The rachis (stalk of the leafy portion of the frond) is conspicuously clothed with light brown down.—*Hooker*, *Species Filicum*, ii., p. 18. *Nicholson*, *Dictionary of Gardening*, i., p. 29. *Lowe*, *Ferns British and Exotic*, iii., t. 18.

A. Wagneri—Wag′-ner-i (Wagner's), *Mettenius.*

As a purely decorative Fern, this greenhouse species, native of the Andes of Peru and more extensively known as *A. decorum* (under which name it has been described by Moore), may be considered as one of the most valuable species in cultivation. In general appearance it may be said to rank midway between *A. cuneatum* and *A. concinnum.* The fronds, larger in all their parts than those of the first-named species, are produced in the same way from a close, tufted crown: they are from 9in. to 15in. long, tripinnate (three times divided to the midrib), and borne on black, shining stipes (stalks) 4in. to 6in. long. The pinnules (leafits) have their lower border straight in a line with the stalk, the inner border overlapping the rachis (stalk of the leafy portion of the frond), and their outer border distinctly lobed. The round or slightly kidney-shaped sori (spore masses) are disposed at the extremity of the lobes, from four to six being found on each pinnule.—*Hooker*, *Synopsis Filicum*, p. 473. *Nicholson*, *Dictionary of Gardening*, i., p. 26.

A. Waltoni—Wal′-ton-i (Walton's), *Moore.*

This is one of the several supposed hybrids of garden origin which apparently owe their existence to the influence of *A. æmulum.* Its fronds, produced from a close, tufted crown, and borne on black, shining stalks 6in. to 9in. long, are nearly 1½ft. long, broadly ovate (egg-shaped), upright, and quadripinnate (four times divided to the midrib). Their pinnæ (leaflets or first divisions) are equally ovate in form and occupy an ascending position; the lower ones are borne on comparatively long, slender stalks, while the upper ones have their pinnules (leafits) next to the rachis (stalk of the leafy portion of the frond) elongated and compound (lengthened and joined together). The leafits, all attached to short, very slender footstalks, are more or less cuneiform (wedge-shaped), and the round and abundant sori (spore masses) are disposed in a sinus (depression) of the marginal lobes, four to six to a fertile pinnule.—*Nicholson, Dictionary of Gardening,* iv., p. 485.

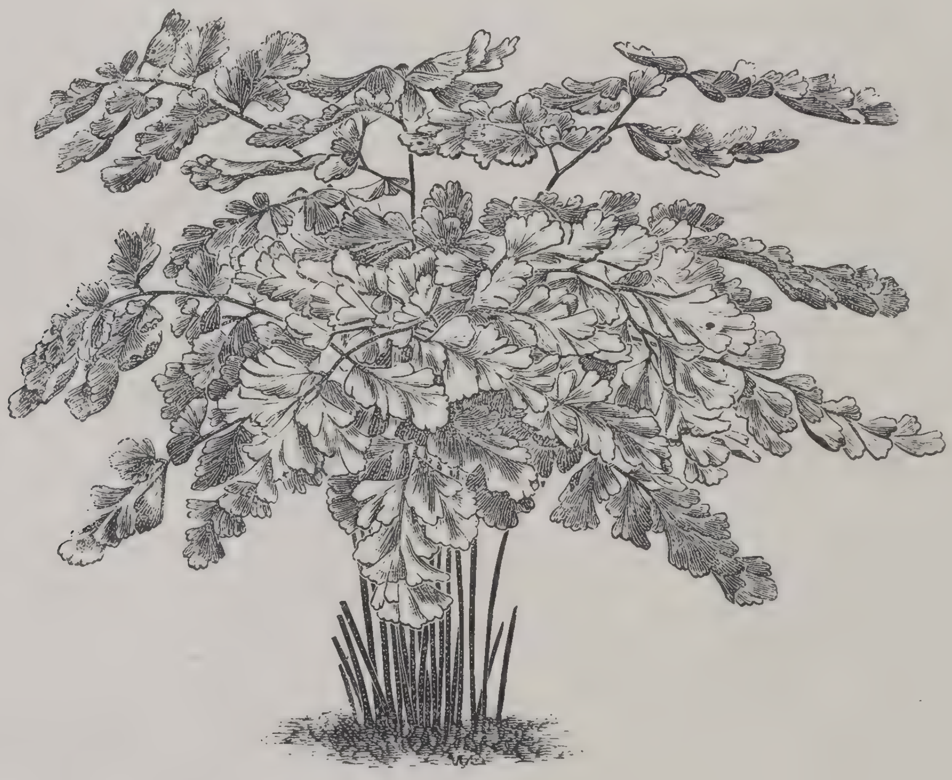


Fig. 49. Adiantum Weigandii
(⅕ nat. size).

A. Weigandii—Wei-gand′-ĭ-i (Weigand's).

This very pretty, stove Fern, of particularly neat habit and pleasing colour, originated in American gardens, whence it was brought to Europe under the stated name, but without any authority for it. Mr. Moore, however, retained the name, and published an extensive description, from which the following are the most important passages: "We regard this as a very distinct plant, one of pleasing character likely to be used for decorative purposes. The fronds have about the same size and outline of the useful *A. decorum*, and the habit is similar, but the pinnules are quite different. These organs have a peculiar aspect, being very freely and conspicuously lobate at the edge, and yet appearing to be but little divided, on account of the very narrow sinuses (depressions) between the lobes. The lobes are large and few, and in consequence the pinnules in some instances have very much the cutting to be observed in the leaves of the Hawthorn. The apical portions of the fronds and of the pinnæ (leaflets) are crowded." To the foregoing description we may add that the fronds, triangular in shape and tripinnate (three times divided to the midrib), are about 1ft. long, and being produced from a close crown they form a neat tufted mass of foliage (Fig. 49); also that the numerous large, nearly circular sori (spore masses) are disposed one or two on each lobe, at the tip of which they are situated. —*Nicholson, Dictionary of Gardening*, iv., p. 486.

A. Wilesianum—Wiles-ĭ-a′-num (Wiles'). Synonymous with *A. crenatum.*

A. Williamsii—Will-iams′-ĭ-i (Williams'), *Moore.*

One of the most beautiful of all known Maidenhair Ferns, and one which thrives well under cool treatment, as it is a native of the mountains of Peru, where it is found at a great elevation. It may possibly be a form of the very variable *A. æthiopicum*, and has somewhat the general aspect of *A. æ. chilense*, although its growth is not so dense: it is also of a free and more vigorous constitution. The beautiful fronds, which are borne on slender, black stipes (stalks) 6in. to 12in. long, are tripinnate (three times divided to the midrib), triangular in shape, and elegantly arched. The pinnæ (leaflets) are set a little distance apart, and the pinnules (leafits), nearly circular in shape, have their margin entire, slightly undulated, or divided into three or four lobes notched between the sori (spore masses), the sterile or barren portions with an erose (gnawed), diaphanous (transparent) margin. These pinnules, about ½in. broad, are attached to the rachis (stalk of the leafy portion of the frond) by very slender footstalks about ¼in. long, so that the parts of the frond are nowhere crowded. When in a young state the stalks as well as the fronds are dusted with a bright yellow powder, which gradually disappears as the fronds become mature. The sori, from eight to ten to each pinnule, are of a lengthened kidney-shape, and are disposed all round the semicircular outer edge. See Plate (for which we are indebted to Mr. B. S. Williams).—*Nicholson*, *Dictionary of Gardening*, i., p. 29.

A. Williamsii is essentially a basket plant, and it is especially for that purpose that it is most valuable, the more so that it is one among the very few Adiantums which really make a good, effective basket for the greenhouse.

A. Wilsoni—Wil′-son-i (Wilson's). Synonymous with *A. dolosum.*

A. Zahnii—Zahn′-ĭ-i (Zahn's). A garden appellation synonymous with *A. Seemannii.*

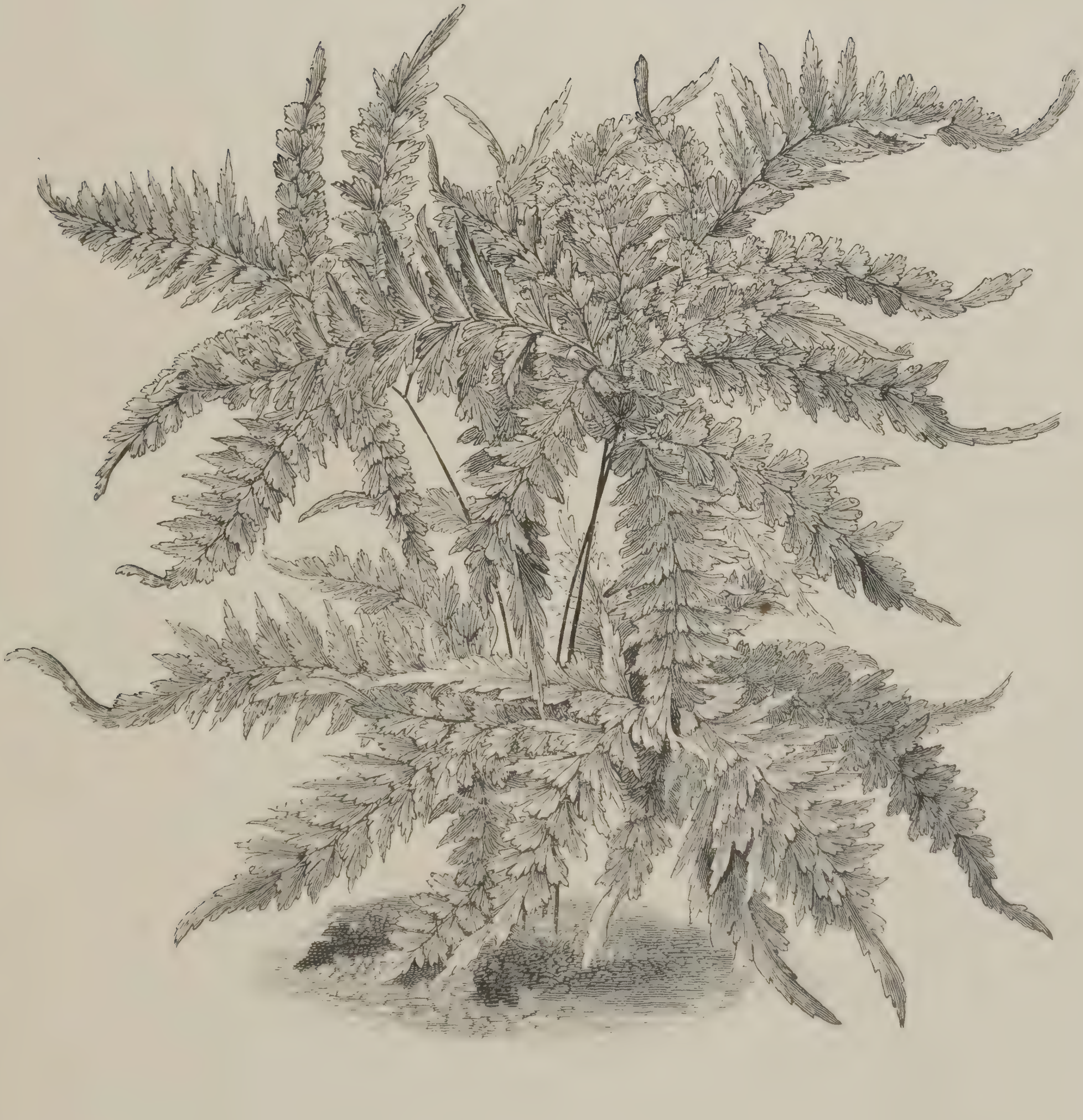
* * *

ADIANTOPSIS—Ad-ĭ-ant-op′-sis. *See* **Cheilanthes.**

AGLAOMORPHA—Ag-lă-om-orph′-a. *See* **Polypodium.**

ALEURITOPTERIS—Al-eu-ri-top′-ter-is. *See* **Cheilanthes.**

ALLOSORUS—All-os-o′-rus. *See* **Cheilanthes, Cryptogramme,** *and* **Pellæa.**



Adiantum novæ-caledoniæ

(⅓ nat. size).

CHAPTER XXI.

ALLANTODIA, *Wallich.*

(All-an-to′-dĭ-a.)

THE name of this genus, which in the "Synopsis Filicum" is given as Genus 39 and is included in the tribe *Asplenieæ*, is derived from *allas*, *allantos*, a sausage, in allusion to the cylindrical form of the indusium (covering of the spore masses). Up to the present, *Allantodia* comprises but one known species, with thin, ample pinnæ (leaflets), and closely allied to the extensive genus *Asplenium*, from which it differs by the dehiscence (mode of opening) of the involucre or indusium. The sori (spore masses) are dorsal (situated at the back), linear-oblong (cylinder-shaped), and are attached to the principal veins. The involucre is of the same shape as the sorus, and quite encloses it: when the spores are ripe it bursts in an irregular line down to the centre.

Culture.

Like the Aspleniums, or at least the strong-growing kinds among them, the Allantodia requires a substantial yet light soil, in which its fleshy roots delight to run: a mixture in equal parts of fibrous peat, leaf mould, turfy loam, and silver sand, is that which suits it best. The plant has a great objection to being potted hard, and in potting it care must be taken that the drainage should be as perfect as possible, for if there is stagnation of water about the roots the foliage soon becomes flabby and begins to show unmistakable signs of ill-health. The Allantodia is also averse to strong light, and to preserve the bright green colour peculiar to its fronds it is necessary to protect them from the strong rays of the sun. The waterings must be copious during the summer, and gradually lessened until in winter the roots are kept only sufficiently moist to prevent the plant from shrivelling. The propagation of this species is effected exclusively from spores, which are produced in abundance and germinate freely.

A. Brunoniana—Bru-no′-nĭ-a′-na (Brown's), *Wallich.*

This solitary species, also known as *Asplenium javanicum* of Blume, which grows freely under either greenhouse or stove treatment, is a native of Tahiti, Java, and Ceylon, and is found on the Himalaya Mountains at an elevation of 6000ft. Its fronds, often 2ft. long and about 1ft. broad, are furnished on each side of their rachis (stalk of the leafy portion of the frond) with undivided pinnæ (leaflets) 4in. to 6in. long and 1in. broad. Their veins, forked near the midrib, show two rows of hexagonal areolæ (six-sided cells) occupying the outer half of the space between the midrib and the edge, and are bounded by an intramarginal line. The sori (spore masses) are confined to the anterior vein of the first fork.—*Hooker*, *Species Filicum*, iii., p. 275. *Nicholson*, *Dictionary of Gardening*, i., p. 48. *Beddome*, *Ferns of Southern India*, t. 159.

* * *

ALLOSORUS—All-os-o′-rus. *See* **Cheilanthes, Cryptogramme,** *and* **Pellæa.**

CHAPTER XXII.

ALSOPHILA, *Brown.*

(Al-soph′-il-a.)

THIS genus, which in Hooker and Baker's "Synopsis Filicum" is given as Genus 6 and forms the largest division of the *Cyatheæ*, derives its name from *alsos*, a grove, and *philos*, loving, in allusion to the habitats in which the species are found in their natural state. It comprises several highly-decorative and deservedly-popular Tree Ferns, and numerous species which, though very handsome, are unfortunately known to us as herbarium specimens only, besides other kinds which, no doubt on account of their gigantic proportions, are seldom seen outside botanical gardens and a very few private collections.

The genus *Alsophila* is composed exclusively of exotic species from either tropical or temperate quarters of the globe, the majority of them being natives of Australia, New Zealand, South America, India, Ceylon, Malay, and the West Indian Islands, and a few Tropical African. With the exception of *A. blechnoides*, no other simply-pinnate species has, until now, been recorded as belonging to this genus, which comprises plants with fronds bipinnate (twice divided to the midrib), and other and more numerous kinds in which the fronds are three or four times pinnate. The distinguishing characters of *Alsophila* reside in the globose (nearly spherical) form of their sori (spore masses), which are dorsal (situated at the back of the fronds), and disposed on a vein or in the forking of a vein. These sori mostly stand conspicuously out from the leafy portion of the fronds, and are frequently villous (downy) and destitute of involucres or covering. All the species are Tree Ferns.

Culture.

Nearly all the species comprised in the genus *Alsophila*, which are found inhabiting permanently moist glens and which naturally produce large heads of fronds of great magnificence, have a tendency to attain great dimensions. Some of them, such as *A. australis*, *A. conjugata*, *A. contaminans*, *A. Cooperi*, *A. Leichardtiana*, *A. pycnocarpa*, &c., are frequently seen in their native habitats with stems varying between 20ft. and 30ft. in height; while *A. excelsa*, perhaps the most rapid grower of all, is said to have a trunk or stem between 60ft. and 80ft. high. To induce them to make good growth under artificial conditions, it is necessary that the Alsophilas, as well as all other Tree Ferns, should have an abundant supply of water, which will produce more efficacious results by its being distributed over the stems with a syringe, liberally during the summer, but taking care to moderate the sprinklings during the winter—without, however, suspending them altogether in any case. The plants also require a good quantity of moisture at the roots, and occasional waterings with weak liquid manure are beneficial to them, especially in the spring when unfolding their new fronds. Although Alsophilas grow well in a light conservatory, where they produce fronds of a hardier and more substantial texture, it is under the combined influences of shade and moisture that their most vigorous growth is produced: they should therefore be sufficiently shaded to prevent the sun from burning the fronds as they unfold, as also to keep them from being discoloured when fully developed. Like all other arborescent Ferns, very little pot room will be found sufficient for Alsophilas. They should be potted, tubbed, or, better still, planted out in the houses, in a compost of three parts of peat, one part of fibrous loam, and one part of sand as coarse as procurable: in this they will grow luxuriantly for years without requiring further attention than constant moistening. *A. capensis*, *A. Van Geertii*, and perhaps a few other kinds, produce on their stems young growths, from which they can be propagated; but Alsophilas are usually increased from spores, which are abundantly produced and germinate freely under warm treatment.

Principal Species and Varieties.

A. aculeata—ac-u-lĕ-a′-ta (prickly), *J. Smith.*

This very effective, stove species, which is also known under the name of *A. ferox*, is found widely distributed through the whole of Tropical America and the West Indian Islands. Though somewhat coarse-looking, it is an elegant Fern, remarkable for the lengthy, sharp thorns with which its trunk is profusely armed, and which extend in a lesser degree to the entire length of the stipes (stalks) of its fronds, which frequently attain from 5ft. to 7ft. in length. These fronds are tripinnate (three times divided to the midrib) and have their rachis (stalk of the leafy portion) of a brown colour. The pinnæ (leaflets) are ovate-lanceolate (between egg- and spear-shaped), 1ft. to 1½ft. long, and furnished with stalkless pinnules (leafits) of thin texture, of a dark green colour, deeply pinnatifid (divided half-way to their midrib) and dented (Fig. 50), and the small and abundant sori (spore

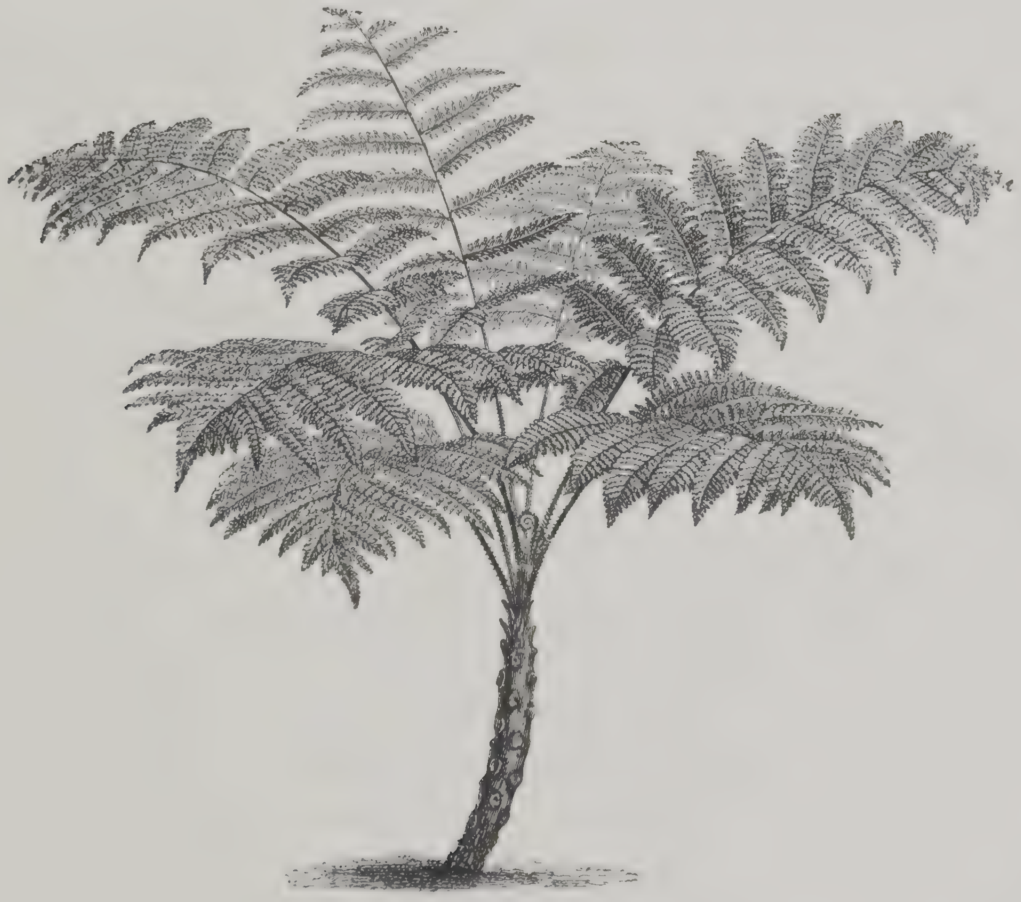


Fig. 50. Alsophila aculeata (much reduced).

masses) are situated on their inferior midvein.—*Hooker*, *Species Filicum*, i., p. 41. *Nicholson*, *Dictionary of Gardening*, i., p. 54. *Lowe*, *Ferns British and Exotic*, viii., t. 65.

A. æthiopica—æth-ĭ-op′-ic-a (Ethiopian), *Welwitsch.*

A very peculiar and well-marked, African, stove species, also known as *A. Currori*, native of Angola and Golungo alto, where it is found at various elevations between 1000ft. and 2400ft. Its trunk, 3ft. to 6ft. high, has a strange appearance, produced by large tubercles, which are the scars left by the fallen fronds. The fronds are of a firm texture and dark green: they measure 4ft. or more in length, are broadly spear-shaped, and are of a smooth nature, except on the ribs, which are hairy on both sides. The pinnæ (leaflets) are 8in. to 10in. long and sub-sessile (nearly stalkless); the lowest are again pinnate, while the others are deeply pinnatifid (divided half-way to their midrib), with lobes ¾in. long and more or less coarsely serrated (toothed like a saw). The veins in the pinnules (leafits) are forked, and the round and numerous sori (spore masses) are situated at the forks nearer the rib than the margin of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 44.

A. alternans—al-tern′-ans (alternated), *Hooker.*

A stove species, native of Penang, with ample, sub-coriaceous (almost leathery), sub-tripinnate (nearly three times divided) fronds of a smooth nature, the rachis (stalk of the leafy portion) of which, equally smooth, is of a tawny-brown colour. Their principal pinnæ (leaflets), set somewhat far apart and borne on short footstalks, are from 10in. to 14in. long and 2in. to 3in. broad, oblong in shape, terminating in a sharp point, and deeply pinnatifid (divided half-way to their midrib), except those at the base, which are again pinnate. The pinnules (leafits) are 1in. to 1½in. long, oblong, pointed, undivided, stalkless, and serrated (dented like a saw) at the margin. The nearly round, compact sori (spore masses) are mixed with numerous jointed hairs, and are sub-biseriate (disposed on nearly two rows on each fertile pinnule).—*Hooker*, *Species Filicum*, i., p. 29. *Beddome*, *Ferns of British India*, t. 236.

A. alutacea—al-ut-a′-cĕ-a (resembling soft leather). A form of *A. infesta.*

A. Andersoni—An-der-so′-ni (Anderson's), *Scott.*

A distinct, stove species, native of Sikkim, where, according to Beddome, it was discovered by Dr. Anderson in the tropical valleys about the Government Cinchona plantations, at elevations varying between 1000ft. and 2500ft., and where it is called "Pulai Nock" by the Lepchas. Its fronds, large and tripinnatifid (three times divided half-way to their midrib), have their rachis (stalk of the leafy portion) of a dark chestnut colour and rough on their under-side. The pinnæ (leaflets) are oblong-lanceolate (oblong-spear-shaped), 1½ft. to 2ft. long, and are furnished with numerous almost stalkless pinnules (leafits) that are cut down to a narrow wing 4in. to 6in. long and nearly 1in. broad; their segments or sub-divisions are closely set, spear-shaped, bluntish, about two lines broad and distinctly toothed on the margins, thin but firm in texture, green on both sides, their ribs, especially below, being densely bristly, not scaly. The very small sori (spore masses) are inframedial (situated below the middle vein of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 459. *Beddome*, *Ferns of British India*, t. 310.

A. armata—ar-ma′-ta (armed), *Presl.*

This very distinct, free-growing, stove species (see Plate), the trunk of which is comparatively slender and covered with whitish, pointed spines, is found throughout the whole of Tropical America, where it is considered one of the commonest species. Its large fronds, of a very graceful appearance and of a pleasing light green colour, 6ft. or more long, and tripinnate (three times divided to the midrib), have their rachis (stalk of the leafy portion) straw-coloured and densely hairy; the stalks and rachises are also densely clothed with whitish spines, similar to those observed on the trunks, although ot smaller dimensions. The pinnæ (leaflets) are oblong-spear-shaped, 1½ft. to 2ft. long, and furnished with numerous pinnules (leafits), which are equally spear-shaped, sessile (stalkless), 3in. to 5in. long, and about 1in. broad. The pinnules, in their turn, are sub-divided into falcate (sickle-shaped), blunt, nearly entire, and toothed segments, both sides of which are densely hairy on the ribs. The round and abundant sori (spore masses) are sub-costular (situated near the midrib of the fertile pinnules). When only partly developed the young fronds are covered with long, white and light brown, chaffy hairs.—*Hooker*, *Species Filicum*, i., p. 40. *Nicholson*, *Dictionary of Gardening*, i., p. 55.

A. aspera—as′-per-a (rough), *Brown.*

A very handsome, stove species, also known as *A. nitens*, native of the West Indies, and readily identified through the large, glossy, lanceolate (spear-shaped) scales, 1in. or more in length, which are found at the base of the stalks. The trunk is 10ft. to 30ft. high, slender, and covered with short, stout spines, which also extend to the stalk and rachis (stalk of the leafy portion) of the fronds. These fronds, which reach some 10ft. to 12ft. in length and are gracefully arched (Fig. 51) and of a very light and pleasing green colour, are bipinnate (twice divided to the midrib). The pinnules (leafits), of oblong shape, are borne on short footstalks: they are pinnatifid (cut

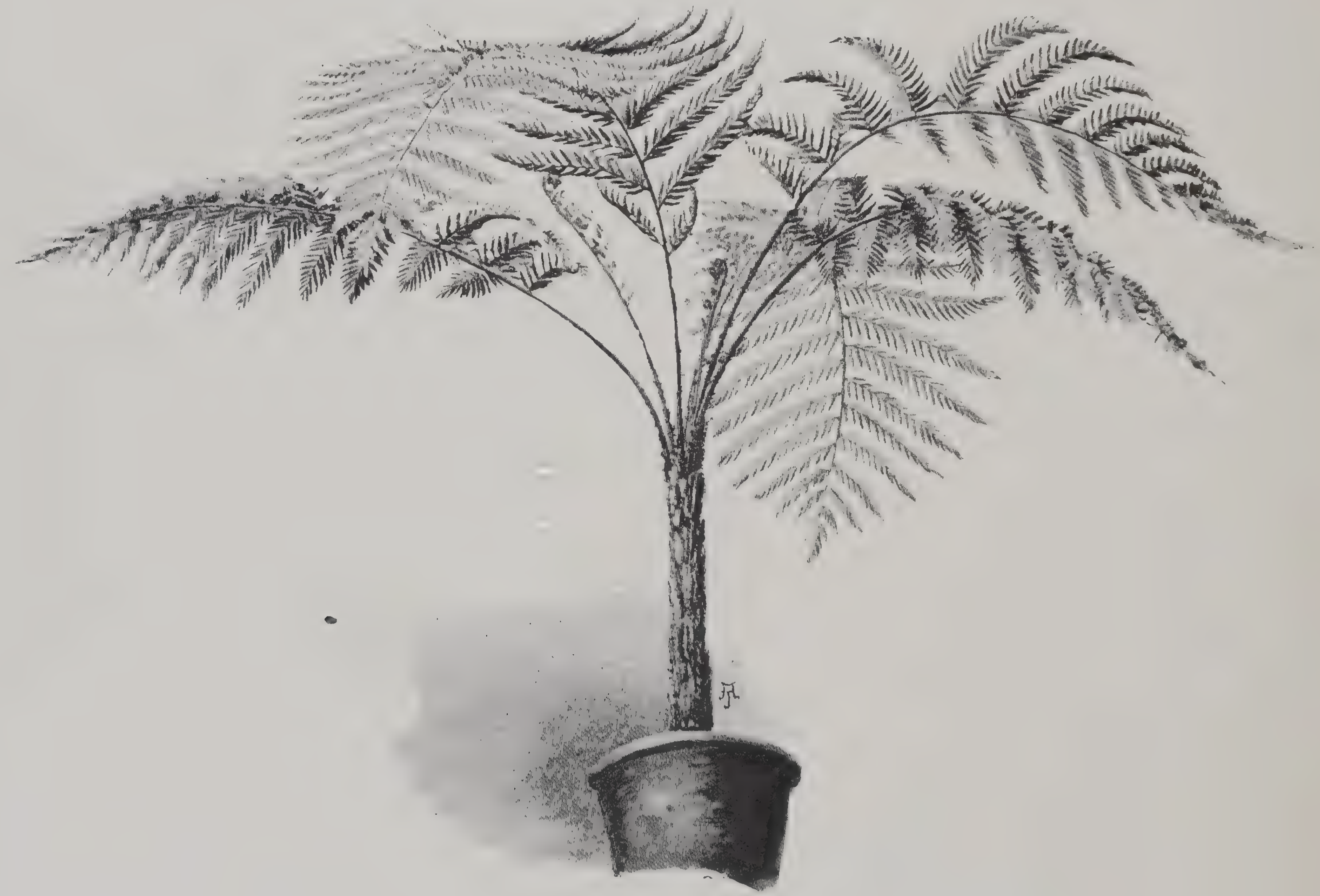


Fig. 51. Alsophila aspera
(much reduced).

down half or two-thirds of the way to their midrib); their lobes are oblong-egg-shaped, often acutely serrulate (sharply toothed), and their midrib shows on the under-surface some scales of a bullate (blistered) appearance. The sori (spore masses), of a very deciduous nature, are situated half-way between the costa (midrib) and the margin of the fertile pinnules.—*Hooker*, *Species Filicum*, i., p. 39, t. 19B. *Nicholson*, *Dictionary of Gardening*, i., p. 55.

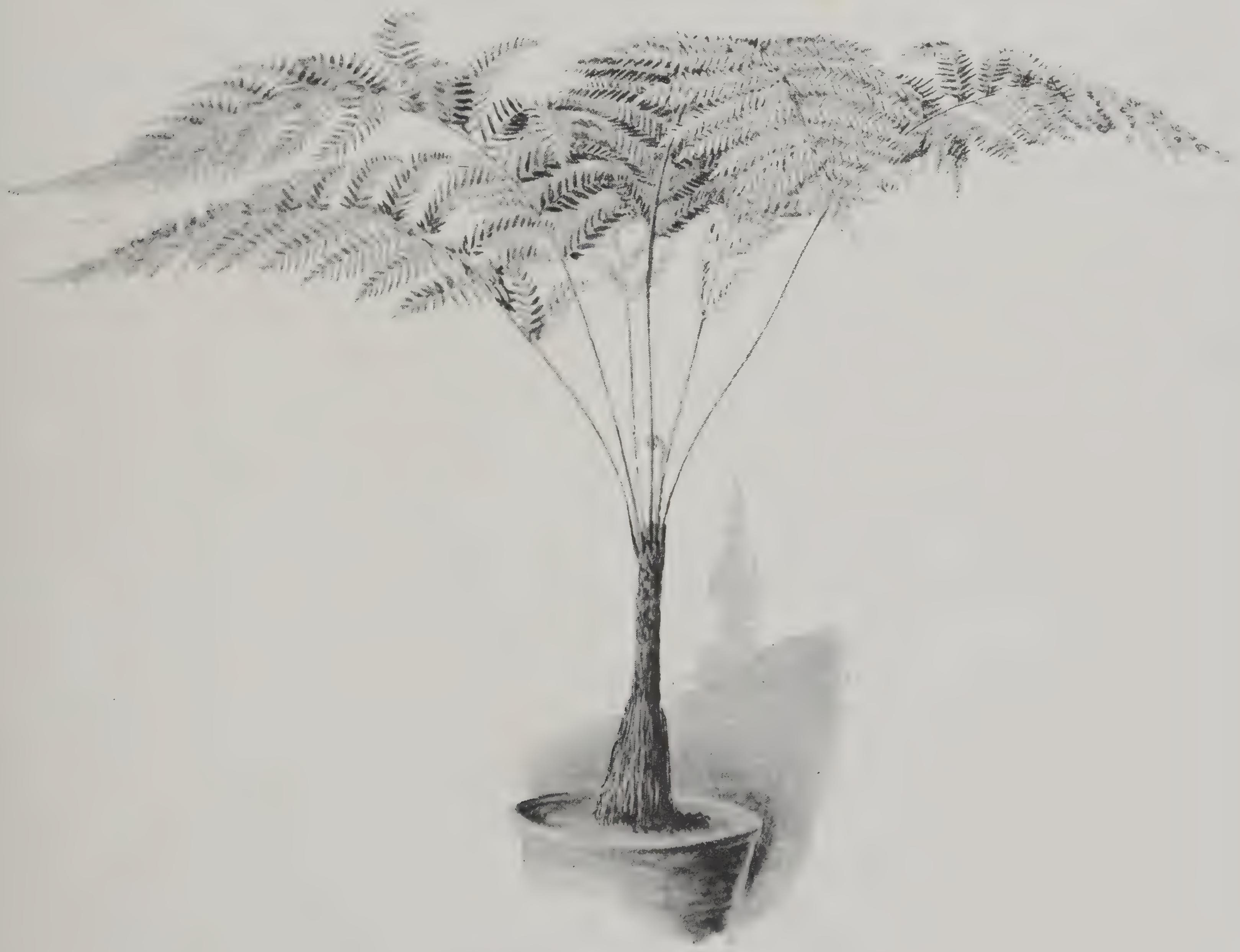


Fig. 52. Alsophila atrovirens
(much reduced).

A. aterrima—a-ter′-rim-a (very black), *Hooker*.

This East Peruvian, stove species, native of Tarapota, is stated by Hooker and Baker to be the blackest-looking species, when dry, with which these authorities are acquainted. Its stalks are copiously aculeate (very prickly), and at the base shaggy with rust-coloured scales, 1½in. long, and fine hairs; the leafy portion of the fronds is large, thick, black above, chocolate-coloured beneath, and clothed with tawny hairs of a woolly nature. Their pinnæ (leaflets), 1ft. or more long, are furnished with pinnules (leafits) 2in. to 2½in. long and ¼in. broad, whose oblong and very obtuse lobes are entire. The rust-coloured sori (spore masses) are disposed chiefly on the lower half of the lobes close to their midrib.—*Hooker and Baker*, *Synopsis Filicum*, p. 38.

A. atrovirens—a′-tro-vir′-ens (dark green), *Presl.*

A gigantic-growing species, native of South Brazil. Its large fronds, tripinnatifid (three times divided half-way to the midrib), are borne on stipes (stalks) about equal in length to their leafy portion (Fig. 52), stout and slightly scaly. Their rachis (stalk of the leafy portion), of a dark straw-colour, sometimes perfectly smooth, at other times slightly muricated (rough, with short, hard excrescences), is furnished with spear-shaped pinnæ (leaflets) 9in. to 15in. long and 3in. to 4in. broad; the pinnules (leafits), cut about half-way down to the midrib, are nearly stalkless, of a sub-coriaceous (almost leathery) texture, dark green on both sides, and without scales; their ascending and entire segments are ⅛in. broad, and blunt. The small and numerous sori (spore masses) are medial (set on the forking of the veins, but close to the midrib).—*Hooker*, *Species Filicum*, i., p. 46.

A. australis—aus-tra′-lis (Southern), *Brown.*

This noble, greenhouse species, native of Tasmania and Australia, especially in the South, is undoubtedly one of the handsomest Alsophilas in cultivation. It is also probably one of the best-known arborescent kinds, forming generally a very straight stem or trunk of great height and well proportioned—neither too slender nor too bulky in appearance. A trunk of 15ft. or 18ft. high generally measures from 2ft. to 2½ft. in circumference, and produces a somewhat flat or spreading head of numerous fronds, 8ft. to 13ft. long and borne on naked stipes (stalks) about 1½ft. long. Their primary pinnæ (principal leaflets), spear-shaped, about 1½ft. long and 6in. to 10in. broad, are furnished with numerous pinnules (leafits), light green above and glaucous (bluish) below, 3in. to 4in. long, acuminate (sharply pointed), and deeply pinnatifid (divided nearly to their midrib), or towards the base even sometimes pinnate. The stalk and rachis (stalk of the leafy portion of the frond), although in this species not exactly spiny, are very rough to the touch and are covered at their base with dark brown, chaffy scales ; the foliage is also altogether of a more leathery texture than that of most other Tree Ferns. The small, round sori (spore masses) are disposed from one to four at the basal portion of the fertile pinnules.—*Hooker*, *Species Filicum*, i., p. 50, t. 19A. *Nicholson*, *Dictionary of Gardening*, i., p. 55. *Lowe*, *Ferns British and Exotic*, viii., t. 63.

A. bipinnatifida—bip-in-na-tif′-id-a (twice divided half-way to the midrib), *Baker.*

A stove species, native of British Guiana, with fronds 2ft. to 3ft. long, bipinnatifid and of a peculiar form, being gradually narrowed from the middle to both ends. They are borne on short, slender, chestnut-coloured, quite smooth stipes (stalks). The central pinnæ (leaflets), provided with short footstalks, are ligulate (strap-shaped), 4in. to 5in. long and ¾in. broad, cut down to a narrow wing into close, blunt, strap-shaped, nearly entire lobes two lines broad and 2in. to 3in. long. These segments, of a thin, papery texture, have both sides green, especially the upper ; they are bristly on the ribs, and the small sori (spore masses) are situated at the forking of the veins, nearer the midrib than the margin of the fertile pinnules (leafits).—*Hooker*, *Synopsis Filicum*, p. 456.

A. blechnoides—blĕch-nŏ-i′-des (Blechnum-like), *Hooker.*

This singular, stove species, remarkable for its large, nearly entire (undivided) pinnæ, is a native of the West Indies and Tropical America. It is the only species with simply-pinnate fronds known. The pinnæ (leaflets) are of a thin yet leathery texture, glossy, 6in. to 12in. long, spear-shaped, suddenly terminating in a point and serrate (dented like a saw) at their summit. The sori (spore masses), mixed with copious long hairs, are scattered in very irregular lines near the midrib and sometimes extending towards the margin.—*Hooker*, *Species Filicum*, i., p. 35.

A. Boivini—Boi-vi′-ni (Boivin's), *Mettenius.*

A stove species, native of the Isle of Mayotte, with fronds ample and tripinnate (three times divided to the midrib). The pinnæ (leaflets) are

1½ft. to 2ft. long, oblong-lanceolate (oblong-spear-shaped), and furnished with spear-shaped pinnules (leafits), which are 3in. to 4in. long and about 1in. broad, borne on short stalks, and divided into oblong, obtuse segments of various natures, the lowest borne on short stalks and the central ones cuneate (wedge-shaped) at their base. The segments are of a thin, papery texture, green on both sides, the lower ones bearing a few scales on the ribs. The very small sori (spore masses) are sub-costular (disposed nearly on the midrib of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 460.

A. Bongardiana—Bon-gar-dĭ-a′-na (Bongard's). A form of *A. lunulata.*

A. capensis—ca-pen′-sis (native of the Cape of Good Hope), *J. Smith.*

The plant thus named by J. Smith, and extensively known in commerce and in private collections under that name, and also as *Amphicosmia capensis* of Moore, is really *Hemitelia capensis* of Brown, which is described further on.

A. caracasana—car-ac′-as-a′-na (from Caracas), *Klotzsch.*

A stove species, native of the Andes of Columbia, with fronds ample, tripinnatifid (divided three times half-way to the midrib), with strap-shaped pinnæ (leaflets) 1½ft. to 2ft. long. The pinnules (leafits) are nearly stalkless, 3in. to 4in. long, 1in. broad, of a thick but not leathery texture, and bright green on both sides; they are again divided into blunt, close, toothed segments only two to three lines broad, on which the sori (spore masses) are disposed nearly on the midrib.—*Hooker*, *Synopsis Filicum*, p. 457.

A. caudata—cau-da′-ta (tailed), *J. Smith.*

This stove species, native of Luzon Island, has a certain affinity with *A. contaminans*, and, as J. Smith thinks, with *A. lunulata.* It is, however, readily distinguished from these species, as indeed from all others, by the extremely peculiar character of its pinnules (leafits), which are sessile (stalkless), oblong-lanceolate (oblong-spear-shaped), broadest at the base, and have their apex (extremity) suddenly contracted into a long, narrow, serrated (toothed like a saw), tail-like, tapering point. The lobes, equally serrated, are somewhat sickle-shaped, and the sori (spore masses) are situated close to the midrib on their lower half. This species is not spiny.—*Hooker*, *Species Filicum*, i., p. 52, t. 20B.

A. chimborazensis—chim-bor-az-en′-sis (from Chimborazo), *Hooker.*

This very distinct, gigantic, stove species, native of Chimborazo, where it is found at between 3000ft. and 4000ft. elevation, has, like *A. melanopus*, the general aspect of *Cyathea divergens*, but the sori (spore masses) are clearly those of *Alsophila.* Its trunk, which is strongly aculeate (prickly), is remarkably slender, for—according to Spruce, who discovered the plant—although 15ft. in height, it only measures 4in. in diameter. The fronds—or rather their leafy portion—of a sub-coriaceous (almost leathery) texture, 9ft. to 10ft. in length and 5ft. in breadth, are borne on very stout stipes (stalks) 3ft. to 4ft. long, of a dirty brown colour and very rough nature, thickly furnished with very sharp, strong spines, and chaffy with large, dark brown, glossy scales. The primary pinnæ (principal leaflets), 2½ft. long and 1ft. broad, have their pinnules (leafits), which are provided with distinct footstalks, rather distant, horizontal, and deeply pinnatifid (divided almost to the midrib). The nearly sickle-shaped, entire lobes have their margins a little recurved, and the sori (spore masses) are situated at the forking of the veins and close to the midrib.—*Hooker*, *Synopsis Filicum*, p. 37.

A. Colensoi—Col-en′-sŏ-i (Colenso's), *Hooker.*

A greenhouse species, of comparatively small dimensions, native of New Zealand and Otago. Contrary to the majority of Alsophilas, its trunk, only 4ft. to 5ft. high, is totally devoid of spines, and the fronds, slightly hairy, 2ft. to 4ft. long and 1ft. or more broad, are borne on short stalks densely clothed with silvery-white scales 1in. long, and with copious dark brown ones of smaller dimensions. The primary pinnæ (principal leaflets) are 12in. to 14in. long, oblong, and acuminate (terminating in a long, tapering point); their pinnules (leafits) are 2in. long and 4in. to 5in. broad, deeply pinnatifid, being divided nearly to the midrib. The lobes, only two to three lines long, are strongly serrated (toothed like a saw), and the small and round sori (spore masses) are disposed nearer the midrib than the margin of the fertile segments.—*Hooker*, *Flora of New Zealand*, ii., p. 8, t. 73.

A. comosa—com-o′-sa (furnished with hair), *Hooker.*

A spineless, stove species, known also as *A. squamulata*, native of Singapore and the Malay Islands. Its fronds are of soft texture, yellowish-green, borne on stipes (stalks) of a shaggy nature on account of their being densely clothed with long, narrow, hair-like scales of a pale brown colour, which also extend all over the rachis (stalk of the leafy portion of the frond); the pinnules (leafits) are oblong, acuminate (terminating in a tapering point), and their lobes, deeply serrated (toothed like a saw), are closely set. The orange-coloured sori (spore masses) are placed a little distance apart, between the costule (midrib) and the margin of the fertile lobes.—*Hooker*, *Species Filicum*, p. 53, t. 20A.

A. concinna—con-cin′-na (neat), *Baker*.

A stove species, which in cutting and texture has a close resemblance to the American *A. aculeata:* it is a native of the Louisiade Archipelago. The ample fronds are tripinnate (three times divided to the midrib), with spear-shaped pinnæ (leaflets). The pinnules (leafits) are short-stalked, ligulate (strap-shaped), 2½in. to 3in. long and ½in. to ¾in. broad; they are again subdivided into segments of the same shape, blunt-toothed, and about one line broad, of moderately firm texture, bright green on both sides, and smooth, although the lower side is slightly rough on the main ribs. The abundant sori (spore masses) fill up the whole of the fertile segments except their extremity.—*Hooker*, *Synopsis Filicum*, p. 459.

A. conjugata—con-jug-a′-ta (coupled together), *Spruce*.

This greenhouse species, of gigantic dimensions, native of Chimborazo, where it is found at elevations varying between 3000ft. and 4000ft., is very remarkable for the exactly opposite primary pinnæ (principal leaflets), the secondary ones being alternate (not disposed face to face). Its trunk or stem, 40ft. high and 3ft. in circumference, is prickly, but destitute of scales. The fronds are 9ft. long, of a coriaceous (leathery) texture, and borne on stipes (stalks) 3ft. long, 1in. or more thick, and furnished with short, stout, and not very sharp spines; they consist of twenty-three pairs of primary pinnæ 2ft. to 3ft. long, all of which are disposed exactly opposite, except at the very point; the pinnules (leafits) are quite sessile (stalkless), 4in. to 5in. long, 6in. to 7in. broad, and deeply pinnatifid (divided nearly to the midrib), thus forming thread-like, pointed lobes, toothed like a saw at the margin, which is slightly recurved. The rather small sori (spore masses) are disposed close to the midrib, one to each serrature (tooth) of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 37.

A. contaminans—con-ta′-min-ans (contaminating), *Wallich.*

This very robust-growing, stove species, known also as *A. glauca*, is a native of Java and the Malay Islands, also of Sylhet and Cachar, near Assam, in India. It forms a slender trunk or stem which is said to attain in its native habitat from 20ft. to 50ft. in height, but which to our knowledge has never reached more than 5ft. or 6ft. in cultivation. The fronds, 8ft. to 12ft. long and bipinnate (twice divided to the midrib), are borne on stipes (stalks) which, like the rachis (stalk of the leafy portion of the frond), are of a purplish-brown colour, glossy and aculeate (prickly). The primary pinnæ (principal leaflets) are 2ft. or more in length and set rather far apart ; they are furnished with sessile pinnules (stalkless leafits) 4in. to 5in. long, ½in. to 1in. broad, somewhat sickle-shaped and deeply pinnatifid (cut nearly to the midrib), of a glaucous (bluish-green) colour underneath, and of a bright glossy green above. Every part of the frond is very brittle. The base of these gigantic fronds—that is, their junction with the trunk or stem—is of a peculiar purple colour, and the stalks, as well as the crown itself from which they are produced, are densely clothed with long, white, chaffy scales. The sori (spore masses) are disposed in the forking of a vein, and nearer the midrib than the margin.—*Hooker*, *Species Filicum*, i., p. 52, t. 18B. *Nicholson*, *Dictionary of Gardening*, i., p. 55. *Beddome*, *Ferns of British India*, t. 85.

A. Cooperi—Coo′-per-i (Cooper's), *Hooker.*

A very handsome species, native of Queensland, in the way of the better-known *A. excelsa*, but of smaller dimensions : it thrives equally well under either stove or greenhouse treatment. The ample fronds are tripinnate (three times divided to the midrib), and have their rachis (stalk of the leafy portion) densely clothed at the base with large scales of a pale brown colour. Their somewhat spear-shaped pinnæ (leaflets) are 1½ft. to 2ft. long, and are furnished with strap-shaped pinnules (leafits) 4in. to 5in. long and ¾in. to 1in. broad, the segments (sub-divisions) of which, equally strap-shaped, are ¼in. to ⅙in. broad and bright green on both sides. The small sori (spore masses) are sub-costular (disposed almost on the midrib or costa of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 459. *Nicholson*, *Dictionary of Gardening*, i., p. 55.

A. crenulata—cre-nu-la′-ta (having small round notches), *Mettenius.*

A stove species, native of Java, with fronds bipinnate (twice divided to the midrib) and pinnules (leafits) spear-shaped, terminating in a long, tapering point, and deeply pinnatifid (divided almost to the midrib). The segments (sub-divisions) are narrow and dented, and the sori (spore masses) are disposed from one to four near the base of the midveins.—*Hooker*, *Synopsis Filicum*, p. 44.

A. crinita—cri-ni′-ta (hairy), *Hooker.*

This singular and very shaggy-looking, stove species, is a native of Java, Ceylon, and the Neilgherries, where, Beddome says, it is found growing in a ravine on the road from Ootacamund to the Davie Shola; it is also common on the Sisparah Ghat and on the higher ranges of the Anamallay Mountains. The fronds, which when young are densely covered with long, chaffy hairs of a light colour, are borne on stipes (stalks) strongly muricate (furnished with short spines having the appearance of tubercular excrescences) and of a peculiar brown colour. The primary pinnæ (principal leaflets) are 2ft. long and 10in. broad, furnished with sessile (stalkless) pinnules (leafits) cut down nearly to their midrib; the lobes thus produced are sickle-shaped and narrow, and have their margins recurved (bent backwards) and toothed. The sori (spore masses) cover the whole of the under-side of the lobes, where they are mixed with finely-dented scales.—*Hooker*, *Species Filicum*, i., p. 54. *Beddome*, *Ferns of Southern India*, p. 20, t. 59.

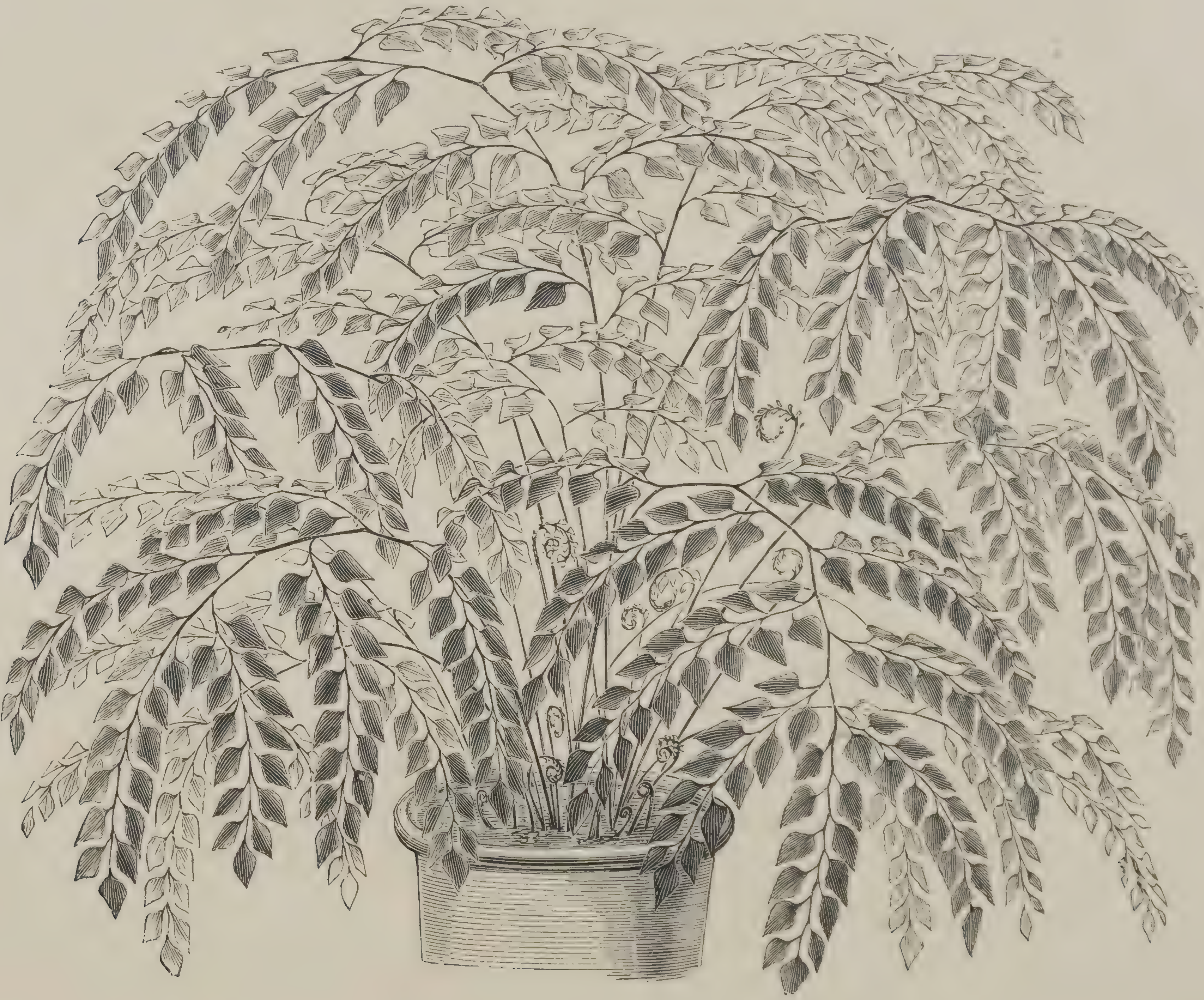
A. Currori—Cur-ror′-i (Curror's). Synonymous with *A. æthiopica.*

A. decipiens—de-cip′-ĭ-ens (deceiving). This is identical with *Hemitelia decipiens* of Scott.

A. decomposita — de-com-pos′-it-a (much divided). A synonym of *A. oligocarpa.*

A. decurrens—de-cur′-rens (running down), *Hooker.*

A stove species, native of Aneitum, the Samoan Islands, and New Caledonia; it is very distinct, and not likely to be confounded with any



Adiantum peruvianum

($\frac{1}{8}$ nat. size).

other. The trunk and stalks are spineless, and the fronds, of a thin texture, bipinnate (twice divided to the midrib) above and three times divided in their other parts, are sparingly covered with long, white hairs on both sides, chiefly on the costules (small ribs) and veins. The primary pinnæ (principal leaflets), oblong and terminating in a long, tapering point, are from 1ft. to 1½ft. long and 6in. broad, and are subdivided into secondary pinnæ of the same shape, 2in. to 3in. long; these are in their turn divided into pinnules (leafits) ⅓in. to ½in. long and ⅛in. broad. The lobes thus produced are egg-shaped, and either with entire margins or with one or two teeth. The sori (spore masses) are disposed one to each lobe in few lax capsules. —*Hooker*, *Species Filicum*, i., p. 51.

A. elegans—e′-leg-ans (elegant), *Martius.*

This stove species, native of Brazil, is apparently rare. Its fronds, of a thick yet leathery texture and bipinnate (twice divided to the midrib), are borne on strong and conspicuously spiny stipes (stalks); the pinnules (leafits), disposed far apart and borne on short footstalks, are 2in. to 2½in. long, narrowly spear-shaped, obtuse at their base, and slightly covered on their under-surface with a woolly substance of a rusty colour. The sori (spore masses) form a more or less interrupted series nearer the midrib than the margin of the fertile lobes.—*Hooker*, *Species Filicum*, i., p. 36.

The variety *crenata* of Kunze is distinguished from the type by having its pinnules distinctly notched.

A. elongata—e-long-a′-ta (elongated), *Hooker.*

A very robust species, native of Columbia and Central America, peculiar through the sharply-spiny nature of the stalks of its fronds, which are bipinnate (twice divided to the midrib), and whose primary pinnæ (principal leaflets), 2ft. to 3ft. long and only 8in. broad, are furnished with spear-shaped and much-lengthened pinnules (leafits) 6in. or more long, terminating in a long, narrow, serrated (dented like a saw), caudate (tail-like) process. The lobes, five to six lines long, are somewhat pointed, stiff, and have their margins recurved (turned back) and serrated. The sori (spore masses) are numerous, and cover the entire segments with the exception of their extremity.—*Hooker*, *Species Filicum*, i., p. 43.

A. excelsa—ex-cel′-sa (tall), *Brown.*

This splendid, greenhouse species, native of Norfolk Island, and which, according to Nicholson, proves nearly hardy in the neighbourhood of Cornwall, is a very rapid grower, and is said to form, in its native habitat, trunks from 60ft. to 80ft. high. Its ample fronds, of a dark green above and paler green beneath, are borne on stipes (stalks) of a rough nature, and their primary pinnæ (principal leaflets), 1½ft. to 2ft. long and 6in. to 10in. broad, are, when young, densely clothed with rusty-coloured hairs intermixed with small scales of a darker colour. The numerous pinnules (leafits) are set close together, oblong-spear-shaped, acuminate (ending in a tapering point), and so deeply pinnatifid that they are frequently cut down to their midrib; the segments which are thus formed are narrow, sickle-shaped, and have their margins recurved (bent inwards) and toothed like a saw, those of the barren fronds being larger and of a paler green than those of the fertile ones, which are also of a more leathery texture. The sori (spore masses) are plentifully disposed close to the midrib of the fertile segments.—*Hooker*, *Species Filicum*, i., p. 49, t. 18A. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. excelsa is essentially a decorative Fern, growing larger and quicker than *A. australis:* young plants of it are every year sacrificed in enormous quantities for indoor decoration, as very little time is required from the seedling state to get them sufficiently strong to be useful for that purpose; but those home-raised seedlings which are kept and grown on, soon form short stems or trunks, producing fine heads of massive yet gracefully-arching fronds, often reaching 4ft. in length. When in that state *A. excelsa* is a most effective plant for sub-tropical gardening, for which purpose it is extensively used.

A. falcata—fal-ca′-ta (sickle-shaped), *Mettenius.*

A very little-known, stove species, native of the Island of Gorgona, where it was discovered by Dr. Seemann. Its ample fronds, borne on smooth, grey-coloured stalks, are tripinnatifid (three times divided half-way to the midrib), of a moderately firm texture, and have both surfaces perfectly smooth. The primary pinnæ (principal leaflets) are spear-shaped, 1½ft. to 2ft. long and 3in. to 3½in. broad; they are furnished with stalkless, sickle-shaped pinnules (leafits) ½in. broad, cut about half-way down into close, denticulate (toothed), blunt segments scarcely ⅛in. broad. The very minute sori (spore masses) are situated just above the midrib of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 458.

A. ferox—fer′-ox (fierce, in reference to the thorny character of the plant). Synonymous with *A. aculeata*.

A. frigida—fri′-gid-a (cold), *Karsten*.

This greenhouse species, which was discovered by Karsten at 15,300ft. elevation on the Andes of Bogota, forms but a very short stem or trunk. Its fronds, tripinnate (three times divided to the midrib) and of a leathery texture, are borne on stipes (stalks) which are sparingly clothed with light hairs of a woolly nature and conspicuously muricated (rendered rough by the presence of short, hard, tubercular excrescences), especially at their base. The pinnæ (leaflets), which from a broad base grow gradually narrower, and terminate in a long, tapering point, are furnished with pinnules (leafits) ½in. long, oblong, more or less adnate (attached on their whole width) at their base, and densely covered with small scales underneath. The lobes are sickle-shaped, obtuse, and notched, and are separated from each other by a very narrow sinus (depression): their margins are revolute (rolled back). The sori (spore masses) are disposed on the forking of the middle vein of the fertile lobes.—*Hooker*, *Synopsis Filicum*, p. 38.

A. Gardneri—Gard′-ner-i (Gardner's). Synonymous with *A. paleolata*.

A. gibbosa—gib-bo′-sa (swollen), *Klotzsch*.

A stove species, native of British Guiana and East Peru. Its large fronds are tripinnatifid (divided three times half-way down to the midrib), and the spear-shaped pinnæ (leaflets) are 1½ft. to 2ft. long. The pinnules (leafits) are borne on long stalks, articulated (jointed) at the base, strap-shaped, 4in. to 5in. long and 1in. broad, and cut down to a broad wing. The segments (sub-divisions) thus produced are of a rigidly leathery texture and dull green colour, falcate (sickle-shaped), finely dented, and set close together. The small and numerous sori (spore masses) are disposed on the midvein of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 457.

A. gigantea—gig-ant-e′-a (gigantic). Synonymous with *A. glabra*.

A. glabra—glab′-ra (smooth), *Hooker.*

This stove species, also known as *A. gigantea*, is found in Java, the Malay Islands, Ceylon, China, and throughout India, in the southern part of which, according to Beddome, it is found on the Anamallay Mountains, Coorg, at an elevation of 4000ft.: it is a very robust-growing kind. The stem or trunk is from 20ft. to 40ft. high, and the fronds, of a sub-coriaceous (almost leathery) texture, are borne on stipes (stalks) that are scaly at their base, but, like the main rachis (stalk of their leafy portion), of an ebeneous-purple colour. The primary pinnæ (principal leaflets), 2ft. or more long, are in their upper portion furnished with pinnules (leafits) which are stalkless, whereas those of their lower part are borne on short footstalks: they are 3in. to 6in. long, 5in. to 8in. broad, and pinnatifid, being divided half-way to the midrib, rarely more. The lobes or sub-divisions thus formed are either triangular or rounded, rarely egg-shaped, and toothed on their edge like a saw. The sori (spore masses), which are found on most of the lobes, are generally disposed in the shape of an inverted V, which, however, does not extend to the apex (point) of the lobe.—*Hooker*, *Species Filicum*, i., p. 51. *Beddome*, *Ferns of Southern India*, p. 20, t. 60. *Nicholson*, *Dictionary of Gardening*, i., p. 56 (as *A. gigantea*).

A. Glasiovii—Glas-ĭ-o′-vĭ-i (Glaziou's), *Baker.*

A handsome, stove, Brazilian species, native of Rio Janeiro, with ample fronds that are bipinnate (twice divided to the midrib). The pinnæ (leaflets) are from 1ft. to 1¼ft. long and somewhat spear-shaped; they are furnished with from twelve to fifteen pairs of distinctly-stalked pinnules (leafits), strap-shaped, 2in. to 2½in. long, six to seven lines broad, of a sub-coriaceous (almost leathery) texture, and crenulated (regularly jagged, with rounded teeth) on their edges. The sori (spore masses) are disposed in a single row a short distance from the midrib of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 456.

A. glauca—glau′-ca (bluish-green). Synonymous with *A. contaminans.*

A. Godmani—God′-man-i (Godman's), *Hooker.*

This very distinct, stove species, native of Guatemala, is particularly elegant, especially when in a small state. Its fronds are bipinnate (twice divided to the midrib), bright green, more or less densely clothed on both surfaces with longish white hairs. Their primary pinnæ (principal leaflets) are 16in. to 18in. long and 4in. to 6in. broad, oblong, terminating in a long, tapering point, furnished with sessile pinnules (stalkless leafits) that are set closely together, 2½in. to 3in. long, five to six lines broad, and deeply pinnatifid (divided so nearly to their midrib as to be almost pinnate). The lobes thus formed, also deeply pinnatifid, are equally set so close together that the space between them can scarcely be seen except when a frond is held between the eye and the light. A peculiarity of this species is the shape of the lowest pair of pinnules, which are exactly square and adnate (attached through their whole length on two sides) to the costule (midrib). The small sori (spore masses) are composed of a few capsules, and are peculiar on account of their hairy nature.—*Hooker*, *Synopsis Filicum*, p. 36.

A. infesta—in-fes′-ta (troublesome), *Kunze.*

This stove species is a native of Tropical America, where it is widely spread. Its fronds are large and tripinnatifid (three times divided nearly to the midrib), and are borne on long stalks of a peculiarly rough nature; their rachis (stalk of the leafy portion) is slightly covered with short, brown scales of a soft, downy character. Their pinnæ (leaflets) are 1ft. to 1½ft. long and oblong-spear-shaped. The pinnules (leafits) are strap-shaped, 3in. long, ½in. to ¾in. broad, of almost leathery texture, dark green on both sides, and cut down to a narrow wing; their segments (sub-divisions) are equally strap-shaped, ⅛in. broad, blunt, nearly entire. The sori (spore masses) are medial (disposed on the central vein of the fertile segments).—*Hooker*, *Species Filicum*, i., p. 42. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

This species is extremely variable, numerous forms of it, differing in size, shape, or disposition of the pinnules, being recorded. Among these we note *A. alutacea* of Kunze, *A. lasiosora* of Mettenius, *A. phalerata* of Martius, &c. The most distinct, however, of all the known forms of *A. infesta*, and the one most extensively found in cultivation, is the following:

A. i. Van-Geertii—Van-Geert′-ī-i (Van Geert's). A commercial name for which we can find no authority.

The plant so called is a distinct and highly-ornamental Tree Fern, whose stem or trunk never attains a great height; it is slender, tortuous, of a bright brown colour, and possesses the peculiarity—very rare in Alsophilas—of producing on its surface lateral growths or young plants, which, when sufficiently furnished with roots, can be safely detached and soon form independent subjects. Although the trunk is of comparatively short stature, it produces very fine, broad, lanceolate (spear-shaped) fronds 5ft. to 6ft. long, including the stalk, which are bipinnate (twice divided to the midrib). The pinnæ (leaflets), also spear-shaped, are 1ft. to 1½ft. long and 5in. to 6in. broad, and are furnished with pinnules (leafits) of a dark, shining green colour and deeply toothed. The stipes (stalks), of a light brown colour similar to that of the trunk, are covered all over with numerous short, black spines. The whole plant is of a particularly elegant habit, its fronds being conspicuously arched in a very graceful manner.

A. intermedia—in-ter-med′-ĭ-a (intermediate). A form of *A. lunulata.*

A. khasyana—khas-ȳ-a′-na (native of Khasya). This is probably identical with *A. latebrosa Oldhami.*

A. lasiosora—las-ĭ-os-o′-ra (having woolly spore masses). A form of *A. infesta.*

A. latebrosa—lat-eb-ro′-sa (dark, shady), *Hooker.*

A stove species, native of Formosa, the Malay Islands, &c., and, according to Beddome, the commonest Tree Fern almost throughout India proper, notably on the Neilgherries, Pulnies, Shevaroys, Anamallay Mountains, &c. The fronds are bipinnate (twice divided to the midrib); they are borne on stipes (stalks) that are prickly at their base, muricated (rough with short, hard, tubercular excrescences) upwards, and of a dark mahogany-brown colour. Their primary pinnæ (principal leaflets) are 1ft. to 2ft. long and 6in. to 8in. broad, and terminate in a tapering point; the pinnules (leafits) are spear-shaped and also taper-pointed, 3in. to 4in. long, ½in. broad, cut down nearly to the rachis (stalk of the leafy portion of the frond) into numerous narrow, blunt, slightly-toothed lobes on each side: these lobes are of soft, papery texture, dark green and smooth on their upper surface, while their lower surface is slightly hairy and scaly. The sori (spore masses), which are elevated and conspicuous, often occupy the lower two-thirds of the fertile segments.—*Hooker, Species Filicum*, i., p. 37. *Beddome, Ferns of Southern India*, p. 19, t. 58.

A. l. Oldhami—Old′-ham-i (Oldham's), *Beddome.*

Like *A. khasyana* of Moore, with which it is probably identical, this plant may safely be given as a form of the above-described species. According to Beddome, it was discovered on the Khasya Hills by Mr. Oldham, to whom he dedicated it. Its fronds are ample and tripinnate (three times divided to the midrib); their primary pinnæ (principal leaflets) are 2ft. long, 8in. to 9in. broad, oblong in shape, and terminate in a tapering point; the pinnules (leafits), with which the pinnæ are densely furnished, are of a thin, papery texture, 4in. to 5in. long and barely 1in. broad, and their costa (midrib) is very scaly underneath and slightly hairy on the upper surface.—*Beddome, Ferns of British India*, t. 343.

A. Leichardtiana—Leich-ardt-ĭ-a′-na (Leichardt's), *F. Mueller.*

This greenhouse species, allied to *A. australis*—from which, however, it is undoubtedly distinct—is one of the finest of all known Australian Ferns. Its beauty has, in fact, been so well appreciated that the same plant has been dedicated to Sir William McArthur by Hooker, who named it *A. Macarthurii*, and to Mr. Charles Moore, of Sydney, by J. Smith, who named it *A. Moorei.* It is the "Whip-stick Fern" of the Colonists, and is found in the woods near Sydney, on the Hastings and Marlony Rivers, in Illawara, &c. Its stem or trunk is of a comparatively slender nature, for while it is said to attain 20ft. to 25ft. in height, it measures only 9in. in diameter. The handsome fronds, which, notwithstanding the size of the trunk, are produced in abundance, are from 6ft. to 10ft. in length, of a firm texture, dark green above, more or less glaucous (bluish-green) beneath, glabrous (smooth) or nearly so, devoid of scales, and tripinnate (three times divided to the midrib). Their stipes (stalks) are peculiarly articulated (jointed) upon the trunk, and the rachis (stalk of the leafy portion of the frond), of an ebeneous-purple colour, is deciduously powdery and spiny. The primary pinnæ (principal leaflets) are 1½ft. to 2ft. long and 8in. broad, oblong-spear-shaped, and terminate in a tapering point; the secondary pinnæ (divisions of the primary ones) are sessile (stalkless), and pinnatifid (divided half-way to their midrib) only at their point, while the ultimate pinnules (sub-divisions) are long, narrow, pointed, and have their margins toothed like a saw and slightly recurved. The copious small sori (spore masses) are disposed close to the costa (midrib) of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 40. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. leucolepis—leu-col′-ep-is (having white scales), *Martius.*

A stove species, native of Brazil and Columbia. Its fronds are large and tripinnate (three times divided to the midrib); the pinnæ (leaflets) are oblong-spear-shaped, 1ft. to 1½ft. long, and furnished with sub-sessile pinnules (almost stalkless leafits) 3in. to 4in. long and nearly 1in. broad. Their ultimate segments (sub-divisions) are strap-shaped, blunt, set somewhat far apart, about ⅛in. broad, and denticulated (furnished with small teeth); they are of a membranous texture and have both surfaces green, but the lower is densely provided with broad white scales on the ribs. The small sori (spore masses) are medial (disposed on the midvein of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 34.

A. Loddigesii—Lod-dig-e′-sĭ-i (Loddiges'), *Kunze.*

This handsome, greenhouse species, native of Cape Byron, New South Wales, somewhat resembles the popular *A. australis*, from which, however, it differs essentially by its shorter fronds, its broader segments, and the disposition of its sori (spore masses). Its fronds, ample and tripinnatifid (three times divided half-way to their midrib), have their rachises (stalks of the leafy portions) of a pale brown colour, glossy or muricated (rough with short, hard, tubercular excrescences). The oblong-spear-shaped pinnæ (leaflets) seldom attain 1ft. in length; they are furnished with stalkless, spear-shaped pinnules (leafits) 2½in. to 3in. long and ½in. to ¾in. broad, cut down to a narrow wing. The segments thus formed are of a moderately firm texture, two lines broad, oblong and entire; both surfaces are green and smooth, although the ribs below are furnished with a few small, spear-shaped scales. The small and numerous sori (spore masses) are medial (disposed on the midrib of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 459.

A. lunulata—lu-nul-a′-ta (having moon-shaped pinnules), *R. Brown.*

A stove species, native of Polynesia, whose stem or trunk attains from 20ft. to 25ft. in height. Its large fronds are tripinnate (three times divided to the midrib), and borne on stalks of a particularly rough nature. The

pinnæ (leaflets) are oblong-spear-shaped, 1½ft. to 2ft. long, furnished with strap-shaped, stalkless pinnules (leafits) 4in. to 5in. long and ¾in. broad, the segments (sub-divisions) of which are closely set, somewhat sickle-shaped, blunt, slightly notched, of a sub-coriaceous (almost leathery) texture, bright green and smooth on both sides. The small and abundant sori (spore masses) are sub-costular (disposed close to the midrib of the fertile segments).—*Hooker*, *Species Filicum*, i., p. 51.

This species is very variable. The following are the most striking amongst its known forms: *A. Bongardiana* of Mettenius, easily recognised through its broader, entire (uncut) segments, which are rather glaucous (bluish-green) underneath and furnished with scales; *A. intermedia*, also of Mettenius, with very broad segments and sori disposed farther apart; *A. Veitchii* of Baker, very distinct through its narrow, nearly pointed segments, which are densely scaly on their midribs beneath, and which are also of a much thinner, softer texture; and *A. vitiensis* of Carruthers, distinguishable from the species or common Viti plant above described through its more rigid texture, as also through its sori being more crowded, and the midribs of its segments being densely scaly underneath.—*Hooker*, *Synopsis Filicum*, p. 41.

A. lurida—lu′-rid-a (lurid, dismal), *Hooker*.

A stove species, native of Java, with fronds broadly spear-shaped, borne on stipes (stalks) perfectly smooth, but with the rachis (stalk of their leafy portion) rough and scaly below, very downy and scaly above. Their principal leaflets are 1ft. long, furnished with pinnules (leafits) more than 2in. long, ½in. broad, cut down to the rachis into numerous narrow segments of almost leathery texture, dark green above, and densely scaly on the ribs underneath. —*Hooker*, *Synopsis Filicum*, p. 43.

A. Macarthurii — Mac-arth′-ur-ĭ-i (MacArthur's). Synonymous with *A. Leichardtiana*.

A. Macgillivrayi—Mac-gil′-liv-ray-i (Macgillivray's), *Baker*.

A stove species from the Louisiade Archipelago. Its large fronds are tripinnatifid (divided three times nearly to the midrib) and of a sub-coriaceous (almost leathery) texture. Their pinnæ (leaflets) are oblong-spear-shaped and

1ft. long; the pinnules (leafits) are equally spear-shaped, distinctly stalked, 2½in. to 3in. long, ½in. broad, and cut down to a narrow wing, smooth, green on both sides, the lower side showing a few broad, pale scales on the ribs. The small and abundant sori (spore masses) are disposed on the midvein of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 458.

A. marginalis—mar-gin-a′-lis (marginal, in allusion to the disposition of the sori), *Klotzsch.*

This well-marked and very distinct, stove species is a native of British Guiana, where it was discovered by R. Schomburgk. Its fronds are large, of a somewhat leathery texture, and bipinnate (twice divided to the midrib), and their primary pinnæ (principal leaflets), borne on stalks of a very chaffy nature, are 1ft. to 1¼ft. long, 4in. broad, oblong, and terminate in a tapering point. The pinnules (leafits) are closely set, stalkless, truncated (abruptly terminated) at the base, entire, and slightly sinuated on the edges. The sori (spore masses), disposed in a single line, form a continuous line a little within the margin of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 32.

A. melanopus—mel-an′-op-us (having a black foot or stalk), *Hooker.*

A stove species, native of Chimborazo, where, according to Spruce, it is found growing at an elevation of 3000ft., and forming stems or trunks 3ft. to 15ft. high, 1ft. in diameter, devoid of spines, but furnished with ramenta (thin scales like wood-shavings). Its remarkably broad fronds are borne on stipes (stalks) 3ft. long, 1in. thick, intense ebony-black, slightly tuberculate at the base, and there covered with long, narrow scales. Their primary pinnæ (principal leaflets), 5ft. long, are divided into twelve pairs of secondary pinnæ 3ft. or nearly so in length and 1ft. broad; the pinnules (leafits) are distinctly stalked, about 6in. long, terminate in a toothed point, and are deeply pinnatifid (cut down nearly to their midrib). The sori (spore masses) are disposed at the forking of each vein, nearer to the rib than to the margin of the fertile segments.—*Hooker*, *Species Filicum*, p. 37.

A. mexicana—mex-ic-a′-na (Mexican), *Martius.*

A stove species, native of Mexico, only known from dried specimens. —*Hooker*, *Species Filicum*, p. 47.

A. microphylla—mi-croph-yl′-la (having small leaves), *Klotzsch.*

A stove species, native of Caracas, with fronds 1½ft. long and bipinnate (twice divided to the midrib); their rachis (stalk of the leafy portion) is semi-terete (half-cylindrical), being convex on the back, plane upwards, and closely hairy. The pinnæ (leaflets) are 4in. to 8in. long, of thin texture, spear-shaped, and spreading; whilst their pinnules (leafits), about 1in. long and ¼in. broad, are sessile (stalkless), pinnatifid (divided nearly to their midrib), oblong, bluntish, smooth above and slightly hairy underneath, especially below the middle, their costa (midrib) being clothed with egg-shaped scales of a bright golden colour. The nearly round, small, whitish sori (spore masses) are inserted on the middle of the back of the veins of the fertile lobes.—*Hooker*, *Synopsis Filicum*, p. 36.

A. Miersii—Mi-ers′-ĭ-i (Miers's), *Hooker.*

This handsome, greenhouse species, native of the Organ Mountains, Brazil, is of a particularly spiny nature. Its smooth fronds, of a somewhat firm texture and bipinnate (twice divided to the midrib), are borne on stipes (stalks) furnished with short but strong spines, which extend to the rachis (stalk of the leafy portion of the frond). The primary pinnæ (principal leaflets) are pinnate (divided to the midrib) to their summit; and the pinnules (leafits) thus formed are distinctly stalked, 5in. to 6in. long, ½in. broad, spreading, narrow spear-shaped, pinnatifid (divided half-way to their midrib), terminating in a fine tapering point. The lobes formed by this subdivision are egg-shaped and entire (uncut), and the rather copious sori (spore masses) occupy their lower portion, being disposed half-way between the midrib and the margin.—*Hooker*, *Species Filicum*, i., p. 38.

A. Moorei—Moor′-ĕ-i (Moore's). Synonymous with *A. Leichardtiana.*

A. myosuroides—mў-os-u′-rŏ-i′-dēs (Myosurus-like), *Liebmann.*

This species—discovered by Dr. Liebmann on the Mexican mountains at 2400ft. elevation—is only known from dried specimens and from his descriptions, from which we gather that the stem or trunk, 10ft. to 16ft. high and 3in. to 4in. in diameter, produces large fronds with distinctly-stalked leaflets 1½ft. to 2ft. long, and pinnules (leafits) 3in. to 3½in. long and ½in. broad.—*Hooker*, *Synopsis Filicum*, p. 38.

A. nigra—nig′-ra (black), *Martius.*

This stove species, native of Rio Negro, Brazil, is one of the most distinct, and one of the easiest to identify, among all the known South American Alsophilas. Its ample fronds, of a peculiarly deep green colour, slightly hairy on all the ribs and rarely showing a few scales on their underside, are borne on rather slender, ebony-black spiny stipes (stalks). The principal rachis (stalk of the leafy portion of the frond) is also ebony-black, and the pinnæ (leaflets), 12in. to 14in. long and 4in. to 5in. broad, are furnished with oblong pinnules (leafits) 2½in. long, ½in. broad, and divided two-thirds of the way down to their midrib: the lobes thus formed are oblong, bluntish, and notched at their edges. The sori (spore masses) are disposed half-way between the midrib and the margin of the fertile lobes.—*Hooker*, *Species Filicum*, i., p. 45.

A. nitens—nit′-ens (bright). Synonymous with *A. aspera.*

A. novæ-caledoniæ—nov′-æ-cal-e-don′-ĭ-æ (native of New Caledonia), *Mettenius.*

A stove species, from New Caledonia. Mettenius compares it with *A. truncata* of Brackenridge, which, no doubt, is the nearest species, but from which it is, however, perfectly distinct. The fronds are tripinnate (three times divided to the midrib), of a leathery texture, glossy as if varnished, and wholly covered underneath with fructification; they are borne on stipes (stalks) of the same rough nature as the rachis (stalk of the leafy portion of the frond). Their primary pinnæ (principal leaflets), 1½ft. long and 6in. broad, are furnished with secondary ones that are sessile (stalkless), very narrow-oblong, ¼in. broad, and pinnate (cut down to their midrib), except at their long, tapering summit, where they are toothed like a saw. The pinnules (leafits) thus formed are two and a-half lines long, less than one line broad, bluntish and stalkless, their recurved margins being furnished with small, roundish teeth. The copious small sori (spore masses) occupy the whole of the space between the midrib and the margin of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 39.

A. oblonga—ob-lon′-ga (oblong), *Klotzsch.*

In this stove species, native of British Guiana, the fronds, ample and tripinnatifid (three times divided half-way to the midrib), have spear-shaped pinnæ (leaflets) 1ft. to 1¼ft. long, and their stalkless, strap-shaped pinnules (leafits) are set closely together, about 2in. long and ½in. broad, and cut down to a distinct wing. The segments thus formed, of a somewhat leathery texture, smooth except on the ribs above and green on both sides, are also strap-shaped, closely set, blunt, entire, and ⅛in. broad. The minute and sparingly-produced sori (spore masses) are situated on the midvein of these fertile segments.—*Hooker*, *Synopsis Filicum*, p. 458.

A. obtusiloba—ob-tu-sil′-ob-a (having blunt lobes), *Hooker*.

This is one of the very few known species from Tropical Africa; it is a native of Sierra del Crystal. Its fronds, of a firm texture and particularly black-green colour, scarcely paler underneath, are borne on short stipes (stalks) scarcely 4in. long, thicker than a swan's quill, and which, like the rachis (stalk of the leafy portion of the frond), are rough and of a dark, glossy, purple colour. These fronds, 4ft. or more long, are pinnate (cut down to the midrib) throughout, and though three or four of the lowest pairs of pinnæ (leaflets) are much dwarfed, the majority of them are from 9in. to 10in. long, borne on short stalks, oblong, and deeply pinnatifid (cut nearly down to the midrib in their lowest portion, but less deeply upwards). The lobes thus produced are five to seven lines long, somewhat sickle-shaped, perfectly entire (uncut), and very blunt. The copious small sori (spore masses) are situated nearer the midrib than the margin of the fertile lobes, and are peculiarly prominent.—*Hooker*, *Synopsis Filicum*, p. 45.

A. Oldhami—Old′-ham-i (Oldham's). A variety of *A. latebrosa*.

A. oligocarpa—ol-ig-oc-ar′-pa (having few fruits), *Fée*.

This stove species, native of the Andes of Columbia, which is also known as *A. decomposita* of Karsten, has the largest and most compound pinnæ (leaflets) of all known species. Its very ample fronds are quadripinnatifid (four times divided half-way to the midrib); their oblong pinnæ are 1½ft. to 2ft. long, and are furnished with stalked pinnules (leafits) 5in. to 6in. long and 1in. broad; the segments of the pinnules, ligulate (strap-shaped), ¼in. broad, of a moderately firm texture, and with both surfaces green and smooth, are deeply pinnatifid, with oblong, blunt lobes, on the midveins of which the sori (spore masses) are disposed four to six to each fertile lobe.—*Hooker*, *Synopsis Filicum*, p. 39.

A. ornata—or-na′-ta (adorned), *Scott.*

A greenhouse species, native of Sikkim, where, according to Beddome, it is found growing on the banks of the Rungbee at an elevation of 2500ft., and is called "Dang Pashin" and "Poschok" by the Lepchas. Its large fronds are tripinnate (three times divided to the midrib), and their oblong-spear-shaped pinnæ (leaflets), 1½ft. to 2ft. long, are furnished with sessile (stalkless), spear-shaped pinnules (leafits) 3in. to 4in. long, ¾in. broad, of a moderately firm texture, green on both sides, and free from either hairs or scales. Their segments (sub-divisions) are strap-shaped, blunt, toothed, and set closely together, and the numerous small sori (spore masses) are disposed close to their costa (midrib).—*Hooker*, *Synopsis Filicum*, p. 460. *Beddome*, *Ferns of British India*, t. 342.

A. paleolata—pal-ĕ-ol-a′-ta (scaly), *Martius.*

This strong-growing, stove species, also known as *A. Gardneri* of Hooker and *A. senilis* of Klotzsch, is a native of Columbia and Brazil, where its slender stem or trunk attains a height of 20ft. Its ample fronds are tripinnatifid (three times divided half-way to the midrib), have their rachis (stalk of the leafy portion) straw-coloured, smooth, and finely-downy below. Their pinnæ (leaflets) are oblong-spear-shaped, 1½ft. to 2ft. long, furnished with strap-shaped, stalkless pinnules (leafits) 3in. to 4in. long, ½in. to ¾in. broad, cut down to a narrow wing: the segments thus produced, of moderately firm texture and densely hairy on both sides, are ligulate (strap-shaped), blunt, nearly entire, and about ⅛in. broad. The unusually large sori (spore masses) are medial (disposed on the midvein of the fertile segments).—*Hooker*, *Species Filicum*, i., p. 41. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. paucifolia—pau-cif-ol′-ĭ-a (having few leaves), *Baker.*

A stove species, native of the Andes of Ecuador, of comparatively dwarf stature, its slender stem or trunk seldom attaining more than 3ft. in height and 1in. in thickness. Its fronds, 2ft. to 3ft. long, are oblong in shape and bipinnate (twice divided to the midrib); they are borne on remarkably black stipes (stalks) about 6in. long: like the stipes, the rachis (stalk of the leafy portion) is black and naked on the under-side, and the scales observed at the base, equally black but edged with brown, are spear-shaped and very glossy. The pinnæ (leaflets) are stalkless and cut down to the rachis, the central ones 6in. to 7in. long and 1in. broad, the lower ones of smaller dimensions. The pinnules (leafits) are of an almost leathery texture, green on both sides, ligulate (strap-shaped), somewhat pointed, toothed, about ¼in. broad, and attached to the rachis on the whole length of their base. The sparingly-produced sori (spore masses) are costular (disposed on the midrib or costa of the fertile pinnules).—*Hooker*, *Synopsis Filicum*, p. 457.

A. phalerata—phal-er-a′-ta (ornamented). A form of *A. infesta.*

A. phegopteroides—phe-gop′-ter-ŏ-i′-dēs (Phegopteris-like), *Hooker*.

This stove species, native of Tarapota, Eastern Peru, is very peculiar on account of the shortness of its stipes (stalks), the character of its fronds—which in outline resemble those of some *Lastrea* or *Phegopteris*—and their hairy clothing, brown and shaggy beneath. It is of comparatively dwarf dimensions, its stem or trunk seldom attaining more than 3ft. in height. Its fronds are bipinnate (twice cut down to the midrib), borne on unarmed stipes (stalks) only 3in. to 4in. long and clothed with large, spear-shaped, glossy, black scales having a pale margin: they are of almost leathery texture, black-green above, paler beneath, hairy on both sides, especially underneath, broadly spear-shaped and pinnatifid (cut half-way down to their midrib). The pinnæ (leaflets) are 3in. to 4in. long and ½in. broad, stalkless, oblong, shortly and bluntly pointed, and cut down very close to their midrib: the lobes thus formed are oblong, very blunt and entire, and have their margins slightly recurved. The sori (spore masses), situated at the forking of the veins, are disposed in a line between the midrib and the margin of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 32.

A. podophylla—pod-oph-yl′-la (having fronds provided with a foot or stalk), *Hooker*.

A greenhouse species, native of Chusan and Hong-Kong, where it is said to be plentiful. It is a very variable species, somewhat resembling *A. glabra* of Hooker, though quite distinct from that species. Its ample fronds, of a somewhat leathery texture, are borne on stipes (stalks) of a peculiarly aculeate (spiny) nature, and, like the rachis (stalk of the leafy portion of the frond), are of a purple-brown colour. The primary pinnæ (principal leaflets) are 2ft. or more long, and pinnatifid (cut half-way to the midrib) at their summit; the pinnules (leafits) are distinctly stalked, 4in. to 8in. long, ½in. to 1in. broad, and extremely variable in form, their base being either sub-hastate (nearly halbert-shaped), heart-shaped, or truncate (terminating abruptly), while sometimes they are either toothed towards their summit, entire (undivided), or slightly lobed, or more or less deeply cut to their midrib. The sori (spore masses) are disposed in a single row running parallel with the primary vein of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 43.

A. Pœppigii—Pœp-pig′-ĭ-i (Pœppig's), *Hooker*.

This stove species, native of Peru, is somewhat allied to *A. paleolata*, from which it essentially differs through its closely-pinnate principal leaflets: these are abundantly furnished with stalkless, elongated, spear-shaped pinnules (leafits), suddenly terminating in a tapering point, and divided nearly to their costa (midrib). The sub-divisions of these pinnules—thick, leathery, and crowded—are narrow-oblong, sickle-shaped, and very blunt: they have their margins slightly curved in and densely clothed to their very point with sori (spore masses), which are freely intermixed with short hairs of a light brown colour.—*Hooker*, *Species Filicum*, i., p. 43.

A. præcincta—præ-cinc′-ta (girded), *Kunze*.

In this stove species, native of Bahia, the fronds are tripinnatifid (three times divided half-way to the midrib); they have oblong-spear-shaped leaflets 1ft. to 1½ft. long, furnished with distinctly-stalked, spear-shaped pinnules (leafits) 3in. to 4in. long and about 1in. broad, cut down to a broad wing. The sub-divisions thus produced are of a somewhat leathery texture, bright green on both sides, blunt, closely and finely toothed, and the very small sori (spore masses) are disposed along their margin.—*Hooker*, *Synopsis Filicum*, p. 458.

A. procera—pro-ce′-ra (tall), *Kaulfuss*.

A stove species, native of Tropical America, where it is very abundant. Its fronds are of a somewhat leathery texture, and bipinnate (twice divided to the midrib), except at their extremity, where they are divided only half-way to the midrib: they are borne on robust stipes (stalks) of a prickly nature, and covered on their lower part with very large and exceedingly glossy scales of a dark brown colour. The primary pinnæ (principal leaflets) are 1ft. long or more, furnished with pinnules (leafits) 2in. to 3in. long, ¼in. broad, bluntish, and cut half-way down to their midrib. The lobes thus produced are mostly entire and often pointed: all of them are provided with sori (spore masses), which are abundant, and disposed between their midrib and their margin.—*Hooker*, *Species Filicum*, i., p. 38. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. pruinata—prŭ-i-na′-ta (like hoar-frost, in reference to the glaucous nature of the under-side of the fronds), *Kaulfuss.*

This remarkably handsome species, which thrives equally well under either stove or greenhouse treatment, is a native of Tropical America and the West Indian Islands. Sir W. J. Hooker remarks that it is an abundant Jamaica Fern, that it has a stem from 3ft. to 8ft. in height, with stipes perfectly smooth, and that Mr. Douglas compares it to a small pine tree, leafy at the top. Its fronds, from 5ft. to 6ft. long and bipinnate (twice divided to the midrib), are borne on stalks devoid of prickles, but densely woolly at their base. The primary pinnæ (principal leaflets) are distinctly stalked, lanceolate in shape, and 1ft. to 1½ft. long; their pinnules (leafits) are also stalked, 3in. to 4in. long, cut more than half-way to their midrib, and sometimes perfectly pinnate (divided to the midrib). The very numerous sub-divisions thus formed are spear-shaped, sharply pointed, finely and conspicuously toothed, about ½in. long, coriaceous (leathery), shining bright green above and glaucous (bluish-green) underneath. The sori (spore masses) are disposed singly near the midvein, one to each of the fertile lobes.—*Hooker*, *Species Filicum*, i., p. 47. *Nicholson*, *Dictionary of Gardening*, i., p. 56. *Lowe*, *Ferns British and Exotic*, viii., t. 66.

Although very scarce in cultivation, this beautiful species deserves every attention, if only on account of its distinctive and ornamental characters, for its fronds, of a particularly elegant habit, are quite as silvery underneath as those of the better-known *Cyathea dealbata*; while the stem or trunk from which they are produced, and which under cultivation seldom attains great dimensions, usually produces several crowns or heads, and by the division of these the plant can be increased.

A. pterorachis—pter-or′-ach-is (having a winged stalk), *Baker.*

A stove species, from Tarapota, East Peru, with fronds 3ft. long, bipinnate (twice divided to the midrib), rendered conspicuous by the peculiar grey colour of their smooth stalk and rachis (stalk of their leafy portion), both of which are covered with spear-shaped scales of a dark brown colour, with a distinct pale border. The upper pinnæ (leaflets) are stalkless, but the lower ones are distinctly stalked, spear-shaped, 5in. to 6in. long and 1½in. to 2in. broad, and furnished with numerous strap-shaped and closely-set pinnules (leafits) of a thin, papery texture, smooth, and bright green on both sides. The very small sori (spore masses) are set in either one or two irregular rows midway between the edge and the midrib of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 456.

A. pubescens—pu-bes′-cens (downy), *Baker.*

This stove species, native of Peru and New Granada, is of very decorative habit. Its stem or trunk, of a slender and flexuose (undulating) nature and conspicuously marked with oval scars, attains about 10ft. in height. The ample fronds are oblong in form, 3ft. to 4ft. long, bipinnatifid (twice divided half-way to the midrib), borne on robust, smooth, brown stipes (stalks) about 1ft. long; the rachis (stalk of the leafy portion), instead of being scaly as in most species, is densely covered with fine, spreading, grey hairs. The pinnæ (leaflets) are shortly stalked, strap-shaped, 5in. to 6in. long and 1in. broad, cut down to a narrow wing into close, entire, blunt lobes of a moderately firm texture, and finely downy all over both sides. The sori (spore masses) are situated at the forking of the veins, near the midrib of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 32.

A. pungens—pun′-gens (very sharp-pointed), *Kaulfuss.*

A stove species, native of British Guiana. Its ample fronds are tripinnatifid (three times divided half-way to the midrib), and furnished with oblong-spear-shaped leaflets 1ft. to 1½ft. long, which are divided into stalkless, spear-shaped, pointed pinnules (leafits) 3in. long and ½in. broad, cut down to a distinct wing. The sub-divisions thus produced are of a somewhat leathery texture, bright green on both sides, sickle-shaped, blunt, and entire (uncut). The very small sori (spore masses) are medial (disposed on the midvein of the fertile segments).—*Hooker*, *Synopsis Filicum*, p. 457.

A. pycnocarpa—pyc-noc-ar′-pa (having dense fruit), *Kunze.*

A very peculiar-looking, stove species (Fig. 53), native of Peru, with a thorny stem or trunk seldom more than 6ft. in height, and ample fronds of a leathery texture and bipinnate (twice divided to the midrib). The primary pinnæ (principal leaflets) are borne on short, articulated (jointed) stalks, and furnished with nearly stalkless pinnules (leafits) dented at the base and bluntish at their summit, of a dark green colour on both

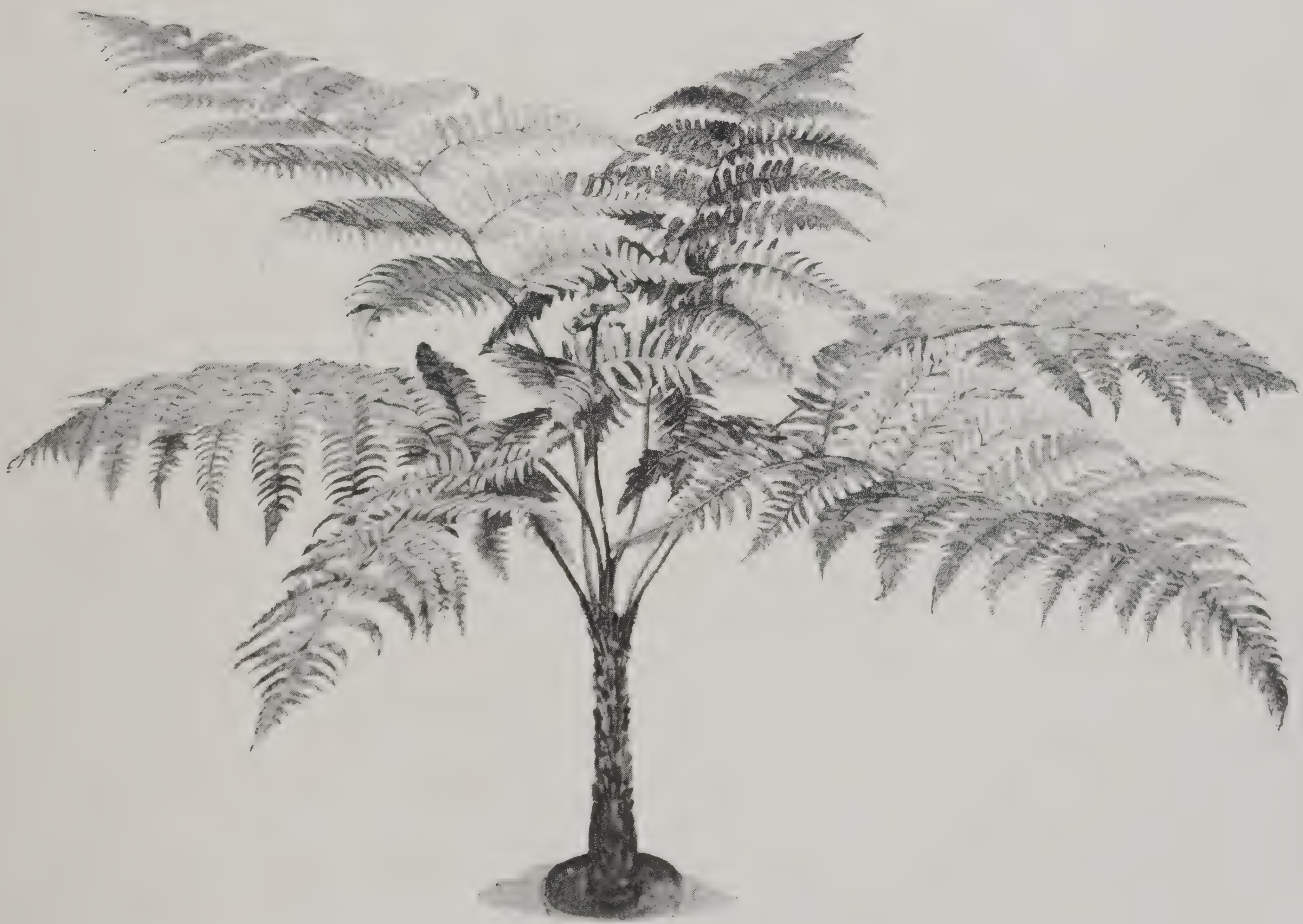


Fig. 53. Alsophila pycnocarpa
(greatly reduced).

sides. The sori (spore masses) are set so closely together in two rows as to be almost contiguous on the fertile pinnules.—*Hooker*, *Species Filicum*, i., p. 46.

A. radens—ra′-dens (rasping), *Kaulfuss.*

This stove species, native of Brazil, is of comparatively short stature: its stem or trunk seldom exceeds 3ft. in height and is only about 3in. in diameter. Its ample fronds, 4ft. to 6ft. long, brilliant green, and of a thin, papery texture, are borne on stipes (stalks) 2ft. to 3ft. long, clothed with egg-shaped scales of a pale brown colour and strongly aculeate (prickly). The primary pinnæ (principal leaflets) are 1½ft. long, acuminate (terminating in a tapering point), divided into narrow-spear-shaped pinnules (leafits) 2in. to 3in. long, which, in their turn, are subdivided into oblong, copiously-toothed segments. The sori (spore masses) are disposed between the midrib and the margin, from four to six on each side of the midrib of the fertile segments.—*Hooker*, *Species Filicum*, i., p. 46. *Nicholson*, *Dictionary of Gardening*, i., p. 56. *Lowe*, *Ferns British and Exotic*, viii., t. 64.

A. Rebeccæ—Reb-ec′-cæ (Rebecca's), *F. Mueller.*

This greenhouse species, native of Queensland, is, through its habit, totally distinct from all other known species. Its stem or trunk, which reaches about 8ft. in height, is of a peculiar smooth nature and comparatively slender, yet it is well furnished with broad fronds 2ft. to 3ft. in length and of a particularly elegant, arching habit. These fronds are of an almost leathery texture, bipinnate (twice divided to the midrib), and their stipes (stalks) being nearly black, form a striking contrast to the glossy, deep green colour of their upper surface. The lower pinnæ (leaflets) are 1ft. to 1¼ft. long and 4in. to 5in. broad: they are furnished on each side with from twenty to thirty pinnules (leafits), the lower ones of which are distinctly stalked, 2in. to 3in. long and about ½in. broad, terminating in a tapering point, while their base, rounded on both sides, is slightly auricled (eared) above. The small and numerous sori (spore masses) are disposed in two rows situated half-way between the midrib and the edge of the fertile pinnules. For the accompanying Plate we are indebted to Mr. William Bull.—*Hooker*, *Synopsis Filicum*, p. 40. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. Robertsiana—Rob-erts-ĭ-a′-na (Roberts'), *F. Mueller.*

A very distinct, greenhouse species, native of Queensland. Its ample fronds are quadripinnatifid (four times divided half-way to the midrib); their pinnæ (leaflets) are oblong-spear-shaped, 1ft. to 1½ft. long, 4in. to 6in. broad, and of a particularly light and feathery nature. The pinnules (leafits) are 2in. to 3in. long, ½in. to ¾in. broad, spear-shaped, closely set, sessile (stalkless) and show a very narrow yet distinct wing all down the rachis (stalk of their leafy portion): their segments are of a soft texture, strap-shaped, close, and deeply cut. The small sori (spore masses) fill up nearly the whole of the fertile divisions.—*Hooker*, *Synopsis Filicum*, p. 459.

A. sagittifolia—sag-it-tif-ol′-ĭ-a (having arrow-shaped leaves), *Hooker.*

This very handsome and distinct, stove species, native of Trinidad, has fronds of very leathery texture, 4ft. to 6ft. long, and bipinnate (twice divided to the midrib). The pinnæ (leaflets) are 9in. to 12in. long, spear-shaped, the lower ones being shorter and deflexed (bent downwards). The stalkless pinnules (leafits) are about 1½in. long, strap-shaped, dented, rounded on both sides at the base, green and smooth on both surfaces, though a few broad, white scales may be noticed on the ribs of the lower ones. The sori (spore masses) are large, and arranged in one irregular row, disposed half-way between the edge and the midrib of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 456. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. Salvinii—Sal-vi′-nĭ-i (Salvin's), *Hooker.*

A very distinct and peculiar, stove species, native of Chilasco, Guatemala. Its fronds are 3ft. long, of a firm—almost leathery—texture, dark green above and pale beneath; their rachis (stalk of the leafy portion) is ¾in. thick, glossy ebeneous-black, and nearly smooth. These fronds are almost spear-shaped, but terminate in a tapering point, and are tripinnate (three times divided to the midrib). The pinnæ (leaflets), oblong in form but terminating in a point, are furnished with closely-set pinnules (leafits) ¾in. long, borne on short footstalks, cut down half-way to their midrib, and toothed at the summit. The sori (spore masses) are disposed in a series nearer the midrib than the margin of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 36.

A. samoensis—sam-o-en′-sis (from Samoa), *Brackenridge.*

In this stove species, native of the Samoan Islands, the stem or trunk is devoid of spines. The fronds are smooth, of a thin, papery texture, and bipinnate (twice divided to the midrib). The long, spear-shaped pinnules (leafits) are again divided half-way to their midrib, and the lobes thus produced are oblong, blunt, and toothed like a saw. The sori (spore masses) are disposed nearer the midrib than the margin of the fertile lobes.—*Hooker, Synopsis Filicum*, p. 39.

A. Schiedeana—Schie-dĕ-a′-na (Schiede's), *Presl.*

A Mexican, stove species, known only from dried specimens. Its ample fronds are of thin texture; the pinnæ and pinnules (leaflets and leafits) are alternate (not opposite), almost stalkless, and cut down more than half-way to the midrib: their sickle-shaped segments are blunt at the summit.—*Hooker, Species Filicum*, i., p. 48.

A. Schlimii—Schlim′-ĭ-i (Schlim's), *Mettenius.*

This handsome, stove species, which through its habit may be said to be intermediate between *A. elongata* and *A. paleolata*, is a native of the Andes of Columbia. Its ample fronds are tripinnate (three times divided to the midrib), and are conspicuous through their rachis (stalk of the leafy portion), of a pale brown colour, being very hairy and also covered with large brown scales. The primary pinnæ (principal leaflets) are oblong-spear-shaped, 1½ft. to 2ft. long, furnished with stalkless, strap-shaped pinnules (leafits) 3in. to 4in. long by ¾in. broad and cut down to a narrow wing. The sub-divisions thus formed are of an almost leathery texture, falcate (sickle-shaped), toothed and closely set; their ribs on both sides are very hairy, and the rest of the surface is slightly so. The sori (spore masses) are situated on the midvein, and cover nearly the whole of the fertile segments except the tip.—*Hooker, Synopsis Filicum*, p. 458.

A. Scottiana—Scot-tĭ-a′-na (Scott's), *Baker.*

A greenhouse species, native of the Eastern Himalayas, and having the habit of *A. latebrosa.* The large fronds are tripinnatifid (three times divided half-way to the midrib), of a moderately firm texture, green on both sides, and without hairs or scales. Their oblong-spear-shaped pinnæ (leaflets) are

1½ft. to 2ft. long; the sessile (stalkless) pinnules (leafits) are 3in. to 4in. long, ½in. broad, strap-shaped, and cut down to a narrow wing or to the rachis (stalk of the leafy portion), which is chestnut-coloured and smooth. The segments thus formed are ligulate (strap-shaped), blunt, toothed, nearly sickle-shaped, and barely ⅛in. broad, and the sori (spore masses) are disposed on or close to their midrib.—*Hooker*, *Synopsis Filicum*, p. 460.

A. senilis—sen-i′-lis (aged). Synonymous with *A. paleolata.*

A. Sprucei—Spru′-cĕ-i (Spruce's), *Hooker.*

This very handsome, stove Fern, native of Chimborazo, where it is found at an elevation of 2500ft., although not really arborescent, is nevertheless of large dimensions. Its fronds, of an almost leathery texture and smooth, are fully 4ft. long: they are produced from a stem or trunk which is reduced to a nearly globular rhizome (prostrate stem), and are borne on stout stipes (stalks) equally 4ft. long, very spiny at the base, and densely clothed on their whole length with scales of a rusty colour and of two different kinds—some long, very slender and hair-like, and others large and lanceolate (spear-shaped). The primary pinnæ (principal leaflets), 1ft. or more long, are furnished with oblong pinnules (leafits) 2½in. to 3in. long and ½in. broad, terminating in a tapering point, and deeply cut nearly to the midrib. The lobes thus produced are sickle-shaped, pointed, entire, and have their margins slightly reflexed (bent back). The sori (spore masses) occupy the entire space between the midrib and the margin of the lobes.—*Hooker*, *Synopsis Filicum*, p. 37.

A. squamulata — squa-mul-a′-ta (slightly scaly). Synonymous with *A. comosa.*

A. subglandulosa—sub-glan-dul-o′-sa (somewhat glandular), *Hance.*

This stove species, native of Formosa, has fronds tripinnate (three times divided to the midrib), and borne on stout stipes (stalks) densely clothed at the base with long, flaccid, narrow scales of a light brown colour. The lower pinnæ (leaflets) are 1ft. long, and are furnished with spear-shaped pinnules (leafits) which have their segments deeply pinnatifid (cut down nearly to the midrib), and ciliated at the edge with glandular hairs. The rachis (stalk of the leafy portion of the frond) is densely clothed with small, narrow, dark-coloured scales. The copious sori (spore masses) are disposed between the midrib and the margin of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 44.

A. Tænitis—Tæn-i′-tis (Tænitis-like), *Hooker*.

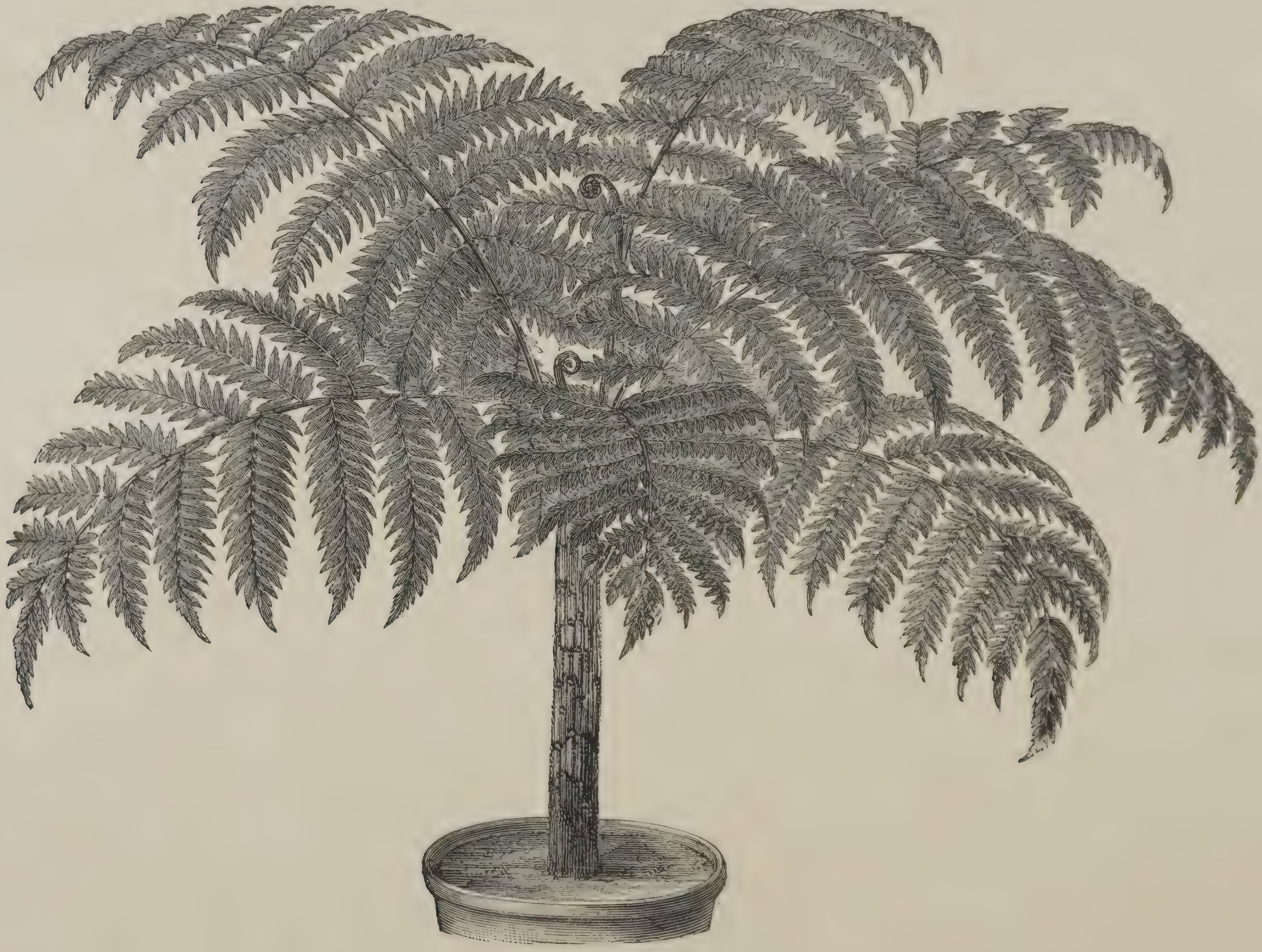
This elegant, stove species, native of Brazil, has fronds 3ft. to 6ft. long and bipinnate (twice divided to the midrib). Their pinnæ (leaflets), 1ft. to 1¼ft. long, are furnished with distantly-set pinnules (leafits) borne on short footstalks, which are peculiarly jointed on to the rachis (stalk of the leafy portion of the frond). These pinnules, of a smooth nature and of a somewhat leathery texture, are lanceolate (spear-shaped), but terminate in a tapering point and measure 3in. to 5in. in length. The sori (spore masses), which are mixed with long, copious hairs, are disposed in a single row midway between the costa (midrib) and the margin of the fertile pinnules.—*Hooker*, *Species Filicum*, i., p. 35. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. tomentosa—to-men-to′-sa (woolly), *Hooker*.

A stove species, native of Java and Formosa, somewhat resembling the Indian *A. crinita*, but scarcely anywhere hairy. The stipes (stalks) and main rachis (stalk of the leafy portion of the frond), of a palish brown colour, are strongly muricated (rendered very rough by the presence of numerous short spines tipped with a black gland). The fronds, with pinnæ (leaflets) 2ft. long by about 10in. broad, are of a leathery texture and of a blackish-green colour above; their stalkless pinnules (leafits), divided nearly to the midrib into narrow-oblong lobes, are of a very peculiar nature, inasmuch as their under-side is conspicuously cobwebby with small, white, ragged scales of a woolly nature. The scales fill up all the interstices of the sori (spore masses), with which the whole under-surface of the frond is covered.—*Hooker*, *Species Filicum*, i., p. 55.

A. tristis—tris′-tis (sad, referring to the dull colour of its foliage), *Blume*.

This very remarkable, stove Fern, native of Java, is distinct not only through the peculiar tint of its fronds, but also through their form, which is intermediate between egg-shape and spear-shape. They are of a blackish-brown colour, 3ft. or more in length, tripinnate (three times divided to the midrib), and borne on stipes (stalks) 2ft. or more long, as thick as a goose-



Alsophila Rebeccæ

(greatly reduced).

quill, dark purple, glossy, and, like the main rachis (stalk of the leafy portion), of a somewhat rough nature. Their primary pinnæ (principal leaflets), 1ft. long and often 4in. broad, are disposed about 4in. apart: they are subdivided into sessile pinnules (stalkless leafits) ¼in. long and cut down half-way to their midrib. The sori (spore masses) are rather larger than usual, and are disposed one to each lobule or sub-division when fertile.—*Hooker*, *Synopsis Filicum*, p. 44.

A. truncata—trun-ca′-ta (maimed, or terminating abruptly), *Brackenridge*.

This is a very distinct and peculiar, stove species, native of the Fiji and Samoan Islands. Its ample fronds are tripinnate (three times divided to the midrib); the primary pinnæ (principal leaflets) are 10in. to 15in. long, 4in. to 5in. broad, oblong in form, but terminating in a tapering point. The very small, stalkless pinnules (leafits) are set at a little distance apart, and are truncated (maimed) at the base; their margin, slightly lobed, is recurved (bent in a backward direction): they are of a firm, leathery texture, bright green above and paler beneath, which tints are shown to great advantage by the dark purple colour of the glossy rachis (stalk of the leafy portion of the frond) and by the dark orange tint of the small sori (spore masses), which are disposed close to the midrib of the fertile pinnules.—*Hooker*, *Synopsis Filicum*, p. 39.

A. Van-Geertii—Van-Geert′-ĭ-i (Van Geert's). A variety of *A. infesta*.

A. Veitchii—Veitch′-ĭ-i (Veitch's). A form of *A. lunulata*.

A. vernicosa—ver-nic-o′-sa (varnished), *Mettenius*.

A stove species, of comparatively small dimensions, native of Venezuela. The fronds are tripinnatifid (three times divided half-way to the midrib) and of a somewhat leathery texture. The oblong-spear-shaped pinnæ (leaflets) are 6in. to 12in. long, and are furnished with almost stalkless, ligulate pinnules (strap-shaped leafits) 1½in. to 2½in. long: these pinnules are cut down to a broad wing into oblong, ascending, close, blunt, entire segments about two lines broad, of a nearly smooth nature, and green on both sides; their ribs underneath are sparingly clothed with a few broad, whitish scales. The moderately large sori (spore masses) are disposed above the midvein of the fertile segments.—*Hooker*, *Synopsis Filicum*, p. 37.

A. villosa—vil-lo′-sa (covered with long, weak hair), *Presl.*

This very beautiful, stove species, native of New Granada, Brazil, Venezuela, and other parts of Tropical America, is of somewhat gigantic dimensions, for its stem or trunk reaches 12ft. in height, and its handsome fronds, 6ft. to 8ft. long, are borne on smooth stipes (stalks) 1ft. or more long, densely clothed at their base with glossy scales of a rusty colour and 1½in. long. These fronds are bi- or tripinnate (twice or three times divided to the midrib), broadly spear-shaped in outline, and furnished with oblong-spear-shaped pinnules (leafits) of a leathery texture, smooth above, but covered on both sides, when in a young state, with a woolly substance, which gradually disappears as the fronds become mature. These pinnules are 2in. to 3in. long, more or less deeply pinnatifid, sometimes divided almost to their midrib into oblong, blunt, entire or coarsely-toothed lobes, on which the sori (spore masses) occupy nearly the whole space between the midrib and the margin. —*Hooker*, *Species Filicum*, i., p. 44. *Nicholson*, *Dictionary of Gardening*, i., p. 56.

A. vitiensis—vi-ti-en′-sis (native of Viti). A form of *A. lunulata.*

A. Wallacei—Wal-la′-cĕ-i (Wallace's), *Mettenius.*

A stove species, native of Borneo, with large fronds tripinnatifid (three times divided half-way to the midrib), and borne on stout stipes (stalks) of a very downy nature. The pinnæ (leaflets) are oblong-spear-shaped, 1ft. to 1¼ft. long, furnished with ligulate (strap-shaped) and distinctly-stalked pinnules (leafits) 1½in. to 2in. long and ½in. broad, cut down to a narrow wing. The sub-divisions thus formed are closely set, equally strap-shaped, blunt, slightly toothed on the margins, of a somewhat leathery texture, and green on both sides, the lower one being very hairy, and furnished on the ribs with a few scales, intermixed with the sori (spore masses).—*Hooker*, *Synopsis Filicum*, p. 459.

A. Wendlandii—Wend-land′-ĭ-i (Wendland's), *Mettenius.*

In this handsome species, native of Costa Rica, the fronds are tripinnatifid (three times divided half-way to the midrib), and their rachis (stalk of the leafy portion) is smooth and of a dull brown colour. The oblong-spear-shaped pinnæ (leaflets) are furnished with stalkless or short-stalked, ligulate (strap-shaped) leafits, which are cut down to a narrow wing. The segments thus produced are of a somewhat leathery texture, closely set, blunt, and dented round the edges. The sori (spore masses), disposed near the midrib, are singularly mixed with dense and much-branched, jointed filaments.—*Hooker*, *Synopsis Filicum*, p. 457.

* * *

AMPHIBLESTRA—Am-phib-le′-stra. *See* **Pteris.**

AMPHICOSMIA—Am-phic-os′-mĭ-a. *See* **Hemitelia.**

ANAPELTIS—An-ap-el′-tis. *See* **Polypodium.**

ANCHISTEA—Anch-is′-tĕ-a. *See* **Woodwardia.**

CHAPTER XXIII.

ANEMIA, *Swartz.*

(An-e′-mĭ-a.)

Flowering Fern.

THIS well-marked genus, which derives its name from *aneimon*, naked, in reference to the peculiar nature of the panicles of sporangia (spore cases), which are popularly, although erroneously, termed inflorescences, is almost confined to Tropical America. It forms Genus 65 in Hooker and Baker's "Synopsis Filicum," and is exclusively composed of Ferns of comparatively dwarf habit, distinguished from nearly all others by having, like our native *Osmunda*, their fructification disposed in a conspicuous "panicle" standing well above the leafy portion of the frond. Through their fertile segments being always wholly contracted, a peculiarity which gives them the appearance of flowering spikes, these interesting plants are popularly known as "Flowering Ferns."

As a distinguishing character, it may be noted that in all the species comprised in the genus the small and very abundant capsules form a copiously-branched panicle quite distinct from the leafy portion of the frond. Several authors have attempted to separate from the genus *Anemia* the few species in which the veins are anastomosing (intermixed), and have made of them the genus *Anemidictyon* (from *aneimon*, naked, and *diktuon*, a net, in reference to the reticulated venation). In like manner some authorities have placed the few species which have the fertile fronds destitute of a foliaceous or leafy portion, into a separate genus, under the name of *Coptophyllum* (from *kopto*, to cut, and *phyllum*, a leaf, in allusion to the invariably divided character of the fertile frond). It seems, however, more natural to keep all the species together, and to use the characters of venation and of the combination or separation of fertile and sterile fronds for making only sectional divisions.

The genus as it now stands, thus comprises the three following sections:

EUANEMIA (Eu-an-e′-mĭ-a), *Hooker.*—In this section the fertile panicle and the leafy barren segments, entire or nearly so, are united in the same frond, which is usually pinnate (only once divided to the midrib), never bipinnate (twice divided to the midrib), but sometimes bipinnatifid or even tripinnatifid (twice or even three times divided half-way to the midrib), with their veins free, but repeatedly forked, so that there is no distinct midvein.

ANEMIDICTYON (An-e′-mid-ic′-tÿ-on), *J. Smith.*—The fertile panicle and the barren leafy portion in this section are united in the same frond, which is invariably pinnate, but in which the veins, instead of being free, are anastomosing (running into each other).

COPTOPHYLLUM (Copt-oph-yl′-lum), *Gardner.*—In this division the barren fronds, which are either twice or thrice pinnate, and the fertile panicle are totally distinct, and borne on separate stipes (stalks).

Most of, if not all, the known Anemias are possessed of a certain decorative value, and their peculiar mode of fructification gives them an additional power of attraction, and entitles them to general cultivation.

Culture.

Although many very interesting species have at different times been introduced from tropical countries, comparatively few have survived the ordeal of acclimatisation, or the effects of the treatment first received after their importation: yet, provided heat and plenty of light are at the disposal of the cultivator, they are not difficult to manage. Anemias will be found to thrive best in a mixture of two parts of good fibrous peat, one part of leaf mould, and one part of sharp, coarse silver sand, the plants being kept on a shelf if in a spacious house, or near the glass if in a warm pit or low house. Watering overhead is very injurious to all of them. They prefer being grown in small pots to being planted out in the Fernery, and although they are not what may be thought the ideal of decorative Ferns, as they cannot be used for general purposes on account of their vegetation being too slow, still, when grouped together or in conjunction with other Ferns of dwarf habit or of medium dimensions, they present a very striking appearance.

Anemias are usually propagated from their spores, which germinate very freely, though some species of a naturally tufted habit may be increased by the division of their crowns, an operation which, to be successful, should be performed between the middle of March and the end of April.

Principal Species and Varieties.

A. adiantifolia—ad-ĭ-ant-if-ol′-ĭ-a (Maidenhair-leaved), *Swartz.*

This very handsome, evergreen, stove species, which is perhaps the best-known of the whole genus, is a native of the West Indies, being found abundantly in Jamaica, Cuba, the Bahamas, St. Domingo, Guadeloupe, also in Central and South America, Southern Florida, Biscayene Bay, Guatemala, and Mexico, where, according to Schott, it is found growing in pine woods and on old ruins. Its fronds, which seldom exceed 1½ft. in height, including the very slender and very hairy stipes (stalks) on which they are borne, are produced from a creeping rhizome (prostrate stem), and have their veins repeatedly forked but not intermixed. They are bipinnate (twice divided to the midrib), except at the base, where they are thrice pinnate: their barren portion is shortly stalked, 6in. to 9in. long, 4in. to 6in. broad, deltoid (in shape like the Greek delta, Δ), and furnished with lanceolate (spear-shaped) pinnæ (leaflets), the lower pair of which are opposite and the others alternate (not opposite). Their pinnules (leafits) are of a leathery texture, dark green on both sides, cuneate (wedge-shaped) at the base, and sharply toothed on the margin, the basal ones being again divided to the midrib. The fertile panicle, situated at the base of the leafy or barren portion of the frond, consists of two upright, contracted segments 3in. to 4in. long, and borne on slender stalks 2in. to 3in. long: they are flattened, and bear two rows of acorn-shaped sporangia (spore cases), provided with a terminal.

transverse ring—a character which is shared by all the species belonging to the same section.—*Hooker, Synopsis Filicum*, p. 434. *Nicholson, Dictionary of Gardening*, i., p. 73. *Lowe, New and Rare Ferns*, t. 32. *Eaton, Ferns of North America*, t. 14, fig. 2, p. 103.

A. affinis—af-fi′-nis (related), *Baker*.

A stove species, native of North Mexico. Its fronds are of a thin, papery texture, and smooth on both sides: they are borne on naked stipes (stalks) 6in. to 10in. long; their barren portion is lanceolate (spear-shaped), 6in. to 8in. long, 1½in. to 2in. broad, composed of eight or nine pairs of spear-shaped or oblong pinnæ (leaflets) ½in. broad, blunt, cuneate (wedge-shaped) on the lower side at the base, nearly square on the upper side, finely and irregularly toothed on the margins. The fertile portion consists of contracted segments 3in. to 4in. long, borne on stalks fully 6in. long.—*Hooker, Synopsis Filicum*, p. 525.

A. (Coptophyllum) aurita—Copt-oph-yl′-lum; au-ri′-ta (eared), *Swartz*.

In this stove species, native of Jamaica, the barren and the fertile fronds, borne on separate stipes (stalks), are entirely distinct. The barren ones, on firm, upright, slightly hairy stalks 2in. to 3in. long, are deltoid (in shape like the Greek delta, Δ), 3in. to 6in. long, 1½in. to 2in. broad, and bipinnate (twice divided to the midrib); their lowest pinnæ (leaflets), which are the largest, are disposed on short footstalks, and are simple or occasionally furnished with two roundish, sessile (stalkless), entire or slightly-toothed pinnules (leafits) on each side: these are of a coriaceous (leathery) texture, and have a glossy surface. The fertile fronds, borne on stalks 6in. to 8in. long, form an interrupted panicle of contracted segments 2in. to 3in. long, the lower branches of which are shorter than the others.—*Hooker, Synopsis Filicum*, p. 435.

A. (Coptophyllum) bipinnata—Copt-oph-yl′-lum; bip-in-na′-ta (twice pinnate), *Moore*.

A stove species, native of the West Indies. Its barren fronds are 2in. to 3in. long, ¾in. broad, and borne on slender, naked stipes (stalks) 1in. to 2in. long: they are tripinnatifid (three times divided half-way to the midrib), and their pinnæ (leaflets), the lowest of which are the largest, are furnished with wedge-shaped, pinnatifid pinnules (leafits) of an almost coriaceous (leathery) texture, and with both surfaces slightly hairy. The fertile fronds, which are totally distinct from the barren ones, consist of contracted segments disposed in a close, elongated panicle borne on a slender stalk 2in. to 3in. long.—*Hooker*, *Synopsis Filicum*, p. 435.

A. Breuteliana—Breu-tel-ĭ-a′-na (Breutel's), *Presl.*

This well-marked, stove species, with which *A. hirta* and *A. filiformis*, both of Swartz, are identical, is widely distributed, for its habitat extends from Mexico and the West Indies to Brazil and Peru. Its singular fronds, borne on slightly hairy stipes (stalks) 6in. to 10in. long, are composed of from six to nine pairs of barren pinnæ (leaflets), 4in. to 9in. long, 1½in. to 2in. broad, of almost leathery texture, and nearly smooth on both surfaces: these pinnæ are stalkless, oblong in form, blunt, rather unequal-sided, entire or slightly cut down in the lower part, and grow smaller gradually upwards. The fertile panicle is composed of contracted segments, disposed at the base of the barren or leafy portion of the frond, 2in. to 4in. long, and borne on footstalks 3in. to 6in. long.—*Hooker*, *Synopsis Filicum*, p. 432.

A. caudata—cau-da′-ta (tailed), *Kaulfuss.*

This stove species, native of Brazil, also known under the name of *A. radicans*, is with *A. rotundifolia* the only species of a proliferous character at present known. Its most singular fronds, borne on slightly hairy stipes (stalks) 6in. to 9in. long, have their barren portion 8in. to 12in. long, often prolonged and rooting at its apex: it is about 2in. broad at the base, very gradually narrowed upwards, and is composed of twenty or more pairs of sessile pinnæ (stalkless leaflets), fully developed on one side of the midrib and scarcely at all on the other, about 1in. long and ¼in. broad, with a blunt point and finely toothed margins. The pinnæ are of a somewhat leathery texture, and both their surfaces, as well as their rachis (stalk of the leafy portion), are slightly hairy. Their fertile portion, situated at the base of the barren one, and borne on a footstalk 3in. to 9in. long, is composed of contracted segments disposed in a loose panicle 2in. to 3in. long.—*Hooker*, *Synopsis Filicum*, p. 432.

A. cheilanthoides—cheil-anth-ŏ-i′-dēs (Cheilanthes-like).

A popular appellation for *A. tomentosa*, and one for which no authority appears to be responsible.

A. ciliata—cil-ĭ-a′-ta (fringed with hairs). Synonymous with *A. hirsuta*.

A. collina—col-li′-na (from the hills), *Raddi*.

This very rare, stove species, also known as *A. hirta* of J. Smith, is a native of Brazil. It is quite distinct from most other known species owing to the ferruginous (rusty) colour of the spreading hairs which densely clothe the firm, upright stipes (stalks) 8in. to 12in. long. The fronds have their barren portion 6in. to 12in. long, 2in. to 3in. broad, and are composed of about twelve pairs of sessile pinnæ (stalkless leaflets), which are about 1½in. long by ½in. broad, unequal-sided, blunt, and nearly entire: these pinnæ are of an almost leathery texture, set further apart than in most other species, and their rachis (stalk of the leafy portion) is, like the stipes, covered with spreading hairs of a rusty colour. The fertile portion, disposed at the base of the barren one, consists of contracted segments 2in. to 3in. long, disposed in a panicle, and borne on slightly hairy footstalks 4in. to 6in. long. See Plate.—*Hooker*, *Synopsis Filicum*, p. 432. *Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. cuneata—cun-ĕ-a′-ta (wedge-shaped), *Kunze*.

This very pretty, stove Fern, native of Cuba, may perhaps be but a small, finely-cut form of *A. adiantifolia*, to which it appears related through the nature of the creeping rhizome (prostrate stem) from which its prettily-divided fronds are produced. The fronds are borne on slender, naked stipes (stalks) 3in. to 4in. long: they are of an almost leathery texture, and have their surfaces as well as the rachis (stalk of their leafy portion) quite smooth. The barren segments are long-stalked, 3in. to 4in. long, and tripinnatifid (divided three times half-way to the midrib): they are furnished with pinnules (leafits), the sub-divisions of which are linear-cuneate (narrow-wedge-shaped) and cleft at their summit. The fertile segments are disposed in a slender, loose panicle, with its lower branches elongated, and are borne on slender footstalks 1½in. long.—*Hooker*, *Synopsis Filicum*, p. 434.

A. deltoidea—del-toid′-ĕ-a (delta-like). Synonymous with *A. tomentosa*.

A. dentata—den-ta′-ta (toothed). Synonymous with *A. filiformis.*

A. (Coptophyllum) dichotoma — Copt-oph-yl′-lum ; dich-ot′-om-a (dichotomous or divided in twos), *Gardner.*

In this stove species, native of Brazil, the barren and the fertile fronds are quite distinct. The barren ones are borne on firm, upright, densely-tufted stipes (stalks) of a peculiarly slender nature ; their leafy portion is only about 2in. long and 1in. broad, oblong in shape, and tripinnate (three times divided to the midrib) ; their segments or sub-divisions, two to three lines long and of almost leathery texture, are filiform (thread-like) and repeatedly forked. The fertile fronds, borne on stalks 3in. to 4in. long, consist of contracted segments forming a panicle 2in. to 3in. long, with the lower branches elongated.—*Hooker*, *Synopsis Filicum*, p. 435.

A. Dregeana—Dre-gĕ-a′-na (Drege's), *Kunze.*

A stove species, native of Natal. Its fronds are borne on firm, slightly hairy stipes (stalks) 8in. to 12in. long ; their barren portion, 8in. to 12in. long and 2in. to 3in. broad, is formed of from eight to twelve pairs of pinnæ (leaflets), which are 1in. to 1½in. long, ½in. to ¾in. broad, unequal at the base, with their upper side somewhat heart-shaped, and their margin conspicuously toothed. These leaflets are of almost leathery texture, and their surfaces and rachis (stalk of the leafy portion) are covered with fine hairs : they show a distinct midrib often half-way to their summit. The fertile portion, situated at the base of the barren one, is composed of contracted segments, disposed in a panicle 3in. to 4in. long, with lower branches stretched out, and is borne on a stalk 3in. to 4in. long. See Fig. 54.—*Hooker*, *Synopsis Filicum*, p. 431. *Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. filiformis—fi-lif-or′-mis (thread-like), *Presl.*

A stove species, native of the West Indies and Brazil, also known in gardens as *A. dentata.* Its fronds are of a very thin, papery texture, finely hairy on both surfaces, borne on peculiarly slender stipes (stalks) 2in. to 3in. long, which are also of a slightly hairy nature. The barren portion, 3in. to 4in. long and 1in. to 1½in. broad, is formed of from six to eight pairs of pinnæ (leaflets), only two to three lines broad, with nearly their own breadth between them, and with the edge deeply toothed. The fertile portion, which consists of contracted segments, is disposed in a panicle 2in. to 3in. long

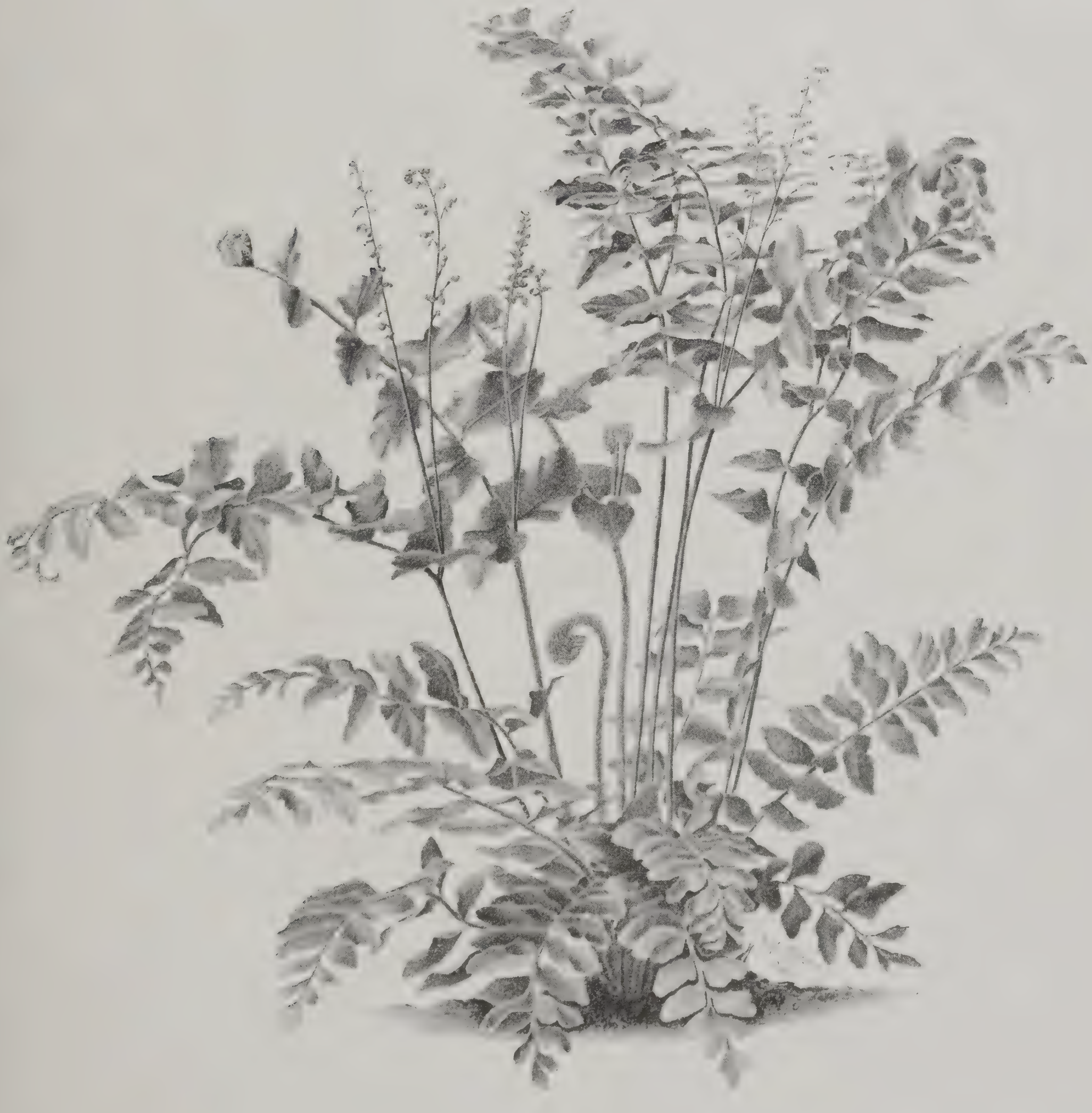


Fig. 54. Anemia Dregeana
(⅓ nat. size).

composed of short branches, and is borne on a footstalk 8in. to 10in. long. *A. filiformis* of Swartz is regarded by Hooker and Baker as synonymous with *A. Breuteliana.—Hooker, Synopsis Filicum*, p. 431.

A. flexuosa—flex-ŭ-o′-sa (wavy). Synonymous with *A. tomentosa.*

A. fraxinifolia—frax-in-if-ol′-ĭ-a (Ash-leaved). A variety of *A. Phyllitidis.*

A. Gardneri—Gard′-ner-i (Gardner's), *Hooker.*

This pretty, stove species, native of South Brazil, and also known in gardens as *A. Glaziovii*, must not be confounded with *A. Gardneriana* of Presl (synonymous with *A. glareosa* of Gardner), also from South Brazil, but from which it is totally different. Its fronds, of a leathery texture, and with rachis (stalk of the leafy portion) and both surfaces naked, are borne on firm, upright, and equally naked stipes (stems) 3in. to 4in. long. Their barren portion, 4in. long by 2½in. broad, is formed of four pairs of imbricated pinnæ (overlapping leaflets), the lowest of which are about 1in. broad: they are all borne on short footstalks, and have their veins quite flabellate (fan-shaped), and their edge conspicuously notched with little, roundish teeth. The fertile portion of the frond, which is situated at the base of the barren one, consists of contracted segments disposed in a panicle about 2in. long, and is borne on a stalk of about equal length.—*Hooker, Synopsis Filicum*, p. 431.

A. Gardneriana—Gard-ner-ĭ-a′-na (Gardner's). This is identical with *A. glareosa.*

A. glareosa—gla-rĕ-o′-sa (growing in gravelly places), *Gardner.*

This stove species, native of South Brazil, is remarkable owing to its barren portion being truly pinnate (once divided to the midrib) only at the base, as also by the rusty-coloured hairs with which the firm, upright stipes (stalks) are densely clothed. It is also known as *A. Gardneriana.* The fronds, of a leathery texture and with both surfaces finely hairy, have their barren portion formed of a terminal lobe and of three or four pairs of oblong, blunt pinnæ (leaflets), only the lowest pair, which are occasionally lobed on the lower side at the base, being divided to the midrib. The fertile portion, formed of dense, short, somewhat upright branches of contracted segments disposed in a panicle 3in. to 4in. long, is borne on a footstalk seldom exceeding 1in. in length.—*Hooker, Synopsis Filicum*, p. 432.

A. Glaziovii—Glaz-ĭ-o′-vĭ-i (Glaziou's). Synonymous with *A. Gardneri.*

A. hirsuta—hir-su′-ta (hairy), *Swartz.*

This very handsome, stove species, native of Jamaica and South Brazil, and also popularly known under the names of *A. repens* and *A. ciliata*, is of comparatively robust habit. Its fronds are bipinnatifid (twice divided halfway to the midrib), and are borne on slender, upright, naked stipes (stalks) 6in. to 12in. long: their barren portion, 2in. to 6in. long and 1in. to 3in. broad, is composed of from six to eight pairs of pinnæ (leaflets) 1in. to 1½in. long, ½in. to ¾in. broad, varying from oblong, blunt, nearly entire, or even truncate (terminating abruptly) at the base on the lower side, to deeply pinnatifid, and with narrow divisions which are of almost leathery texture and have their surfaces slightly hairy. The fertile portion, situated at the base of the barren one, is composed of contracted segments closely set in a panicle 2in. long, and borne on a slender stalk 2in. to 6in. in length.—*Hooker*, *Synopsis Filicum*, p. 433. *Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. hirta—hir′-ta (hairy), *J. Smith.* Synonymous with *A. collina.*

A. hirta—hir′-ta (hairy), *Swartz.* Synonymous with *A. Breuteliana.*

A. Langsdorffiana—Langs-dorff′-ĭ-a′-na (Langsdorff's), *Presl.*

This stove species, native of South Brazil and Venezuela, has somewhat the general appearance of the popular *A. Phillitidis*, from which it differs in several respects, notably in having its veins free instead of intermixed. Its fronds, of almost leathery texture, have their rachis (stalk of the leafy portion) finely hairy, and show a distinct midrib extending nearly to the point of the barren segments. The barren portion, about 6in. long and nearly as broad, consists of six pairs of sessile pinnæ (stalkless leaflets), the lowest the largest, 2½in. long and nearly 1in. broad, the two sides nearly equal at the base, their extremity acuminate (terminating in a tapering point), and serrulate (finely toothed) at the edge. The fertile portion, situated at the base of the barren one, is composed of short branches of contracted segments disposed in a panicle 2in. to 3in. long, and borne on a footstalk of about equal length.—*Hooker*, *Synopsis Filicum*, p. 433.

A. mandioccana—man-dĭ-oc-ca′-na (Mandioccan), *Raddi.*

This very beautiful and distinct, stove species, native of Brazil, is one of the strongest-growing Anemias known in cultivation, for its handsome fronds, borne on strong, upright, hairy stalks 6in. to 12in. long, have their barren portion 1ft. or more long and 2in. to 4in. broad. This portion is oblong-spear-shaped, and its lower half is about of equal breadth throughout: it consists of twenty or more pairs of pinnæ (leaflets), the extremity of which is narrowed, but scarcely pointed; their edge is finely serrulate (toothed like a saw), and the base of their upper side runs parallel with the stalk, while their lower base is obliquely truncate (terminating abruptly in an oblique direction), or sometimes auriculate (eared), 1½in. long, and entire. The leaflets are of almost leathery texture, and their rachis (stalk of the leafy portion) and both their surfaces are finely hairy. The fertile portion of the frond, situated at the base of the barren one, is composed of contracted segments disposed in a panicle of a very compound (closely-set) nature, 3in. to 4in. long, and borne on a footstalk 5in. to 6in. long.—*Hooker*, *Synopsis Filicum*, p. 432. *Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. mexicana—mex-ic-a′-na (Mexican), *Klotzsch.*

This truly Mexican, stove species, found on shady river cliffs near New Braunfels, Texas, at Medina, in Western Texas, and, according to Eaton, in a rocky "arroyo" at the mouth of the River Pecos, is a comparatively robust grower. In general aspect, it much resembles the popular *A. Phyllitidis*, though its fronds, borne on firm, naked, slender, and straw-coloured stipes (stalks) 6in. to 12in. long, instead of being produced from a single crown, arise from a slowly-creeping rhizome (prostrate stem) covered with narrow, curled, blackish-brown hairs. Their barren portion, 6in. to 9in. long and 4in. to 6in. broad, between triangular and egg-shaped, consists of a large terminal leaflet and from four to six pairs of lateral ones, the lowest the largest, all distinctly stalked, 2in. to 3in. long and ½in. to ¾in. broad. The lowest leaflets are distinctly cordate (heart-shaped) at the base, the others are rounded on both sides at the base, and all have their edge slightly toothed. These leaflets are of a coriaceous (leathery) texture, light green above, paler beneath, and their surfaces are quite naked: their general shape is between ovate and lanceolate (egg-shaped and spear-shaped), and the well-marked midvein, distinct to their extremity, as well as the closely-placed, forking veins on each side of it, which give the surface a striated appearance, make this Anemia one of the most conspicuous of all the known species.

The fertile portion of the frond, situated at the base of the barren one, is composed of dense, short branches of contracted segments disposed in a particularly narrow panicle 3in. to 4in. long, and borne on a stalk 2in. to 4in. long.—*Hooker*, *Synopsis Filicum*, p. 433. *Eaton*, *Ferns of North America*, i., t. 14, p. 99.

A. (Coptophyllum) millefolia—Copt-oph-yl′-lum ; mil-lef-ol′-ĭ-a (having barren fronds like the leaves of *Achillea millefolia*), *Gardner*.

A thoroughly distinct, stove species, native of South Brazil, with fertile and barren fronds separate. The barren ones in shape and cutting much resemble leaves of *Achillea millefolia:* they are 2in. to 3in. long, ¾in. to 1in. broad, oblong in shape, tripinnate (three times divided to the midrib), and are borne on dense, upright, hairy stipes (stalks) 1in. to 1½in. long. The oblong pinnæ (leaflets) are of an almost leathery nature, and are divided into flattened segments less than one line broad. The fertile frond, which is a panicle 2in. to 3in. long, composed of short branches of contracted segments, is borne on a separate stalk 3in. to 4in. long and slightly hairy. —*Hooker*, *Synopsis Filicum*, p. 436.

A. oblongifolia—ob-lon-gif-ol′-ĭ-a (having oblong leaves), *Swartz*.

This stove species, also known as *A. Seemanni*, is a native of Brazil and Peru. Its fronds, borne on firm, upright, slightly hairy stipes (stalks) 2in. to 4in. long, have their barren portion 2in. to 4in. long, 1½in. broad, and formed of from six to eight pairs of sessile pinnæ (stalkless leaflets), which are oblong, blunt, and almost entire, the base on the upper side being parallel with the stem. They are of a leathery texture, and have their surfaces finely hairy and their veins flabellate (fan-shaped). The fertile portion, situated at the base of the barren one, consists of a panicle 1in. to 2in. long, formed of numerous short, contracted segments, and is borne on a stalk 5in. to 6in. long.—*Hooker*, *Synopsis Filicum*, p. 431.

A. (Anemidictyon) Phillitidis — An-e′-mid-ic′-tȳ-on ; Phyl-li′-tid-is (Phyllitis-like), *Swartz*.

This species, native of Cuba, Peru, and South Brazil, thrives equally well under either greenhouse or stove treatment. It is of much stronger constitution than most other species, for it produces from a single crown fronds frequently reaching 2½ft. in height, including the naked, light green stipes (stalks), 1ft. to 1½ft. long, on which they are borne. Their barren portion, 8in. to 12in. long and 4in. to 8in. broad, consists of a terminal leaflet and from four to twelve pairs of lateral ones, all stalkless, the lowest the largest, 2in. to 6in. long, 1in. to 2in. broad, pointed at their extremity, their base rounded or heart-shaped: they are bright green and of a tolerably tough texture, and have a distinct midvein extending to their extremity. The fertile portion, borne on a stalk 3in. to 8in. long, is composed of short, contracted segments, disposed in a dense panicle 4in. to 9in. long. See Coloured Plate.—*Hooker*, *Synopsis Filicum*, p. 435. *Nicholson*, *Dictionary of Gardening*, i., p. 73.

Several varieties of this species are in cultivation, the most striking of which are here described:

A. P. fœtida—fœt′-id-a (fetid), *Baker*.

A variety distinguished from the species only by its smaller dimensions and by the disagreeable smell that is emitted by its foliage at all times, but principally during the development of the young fronds.

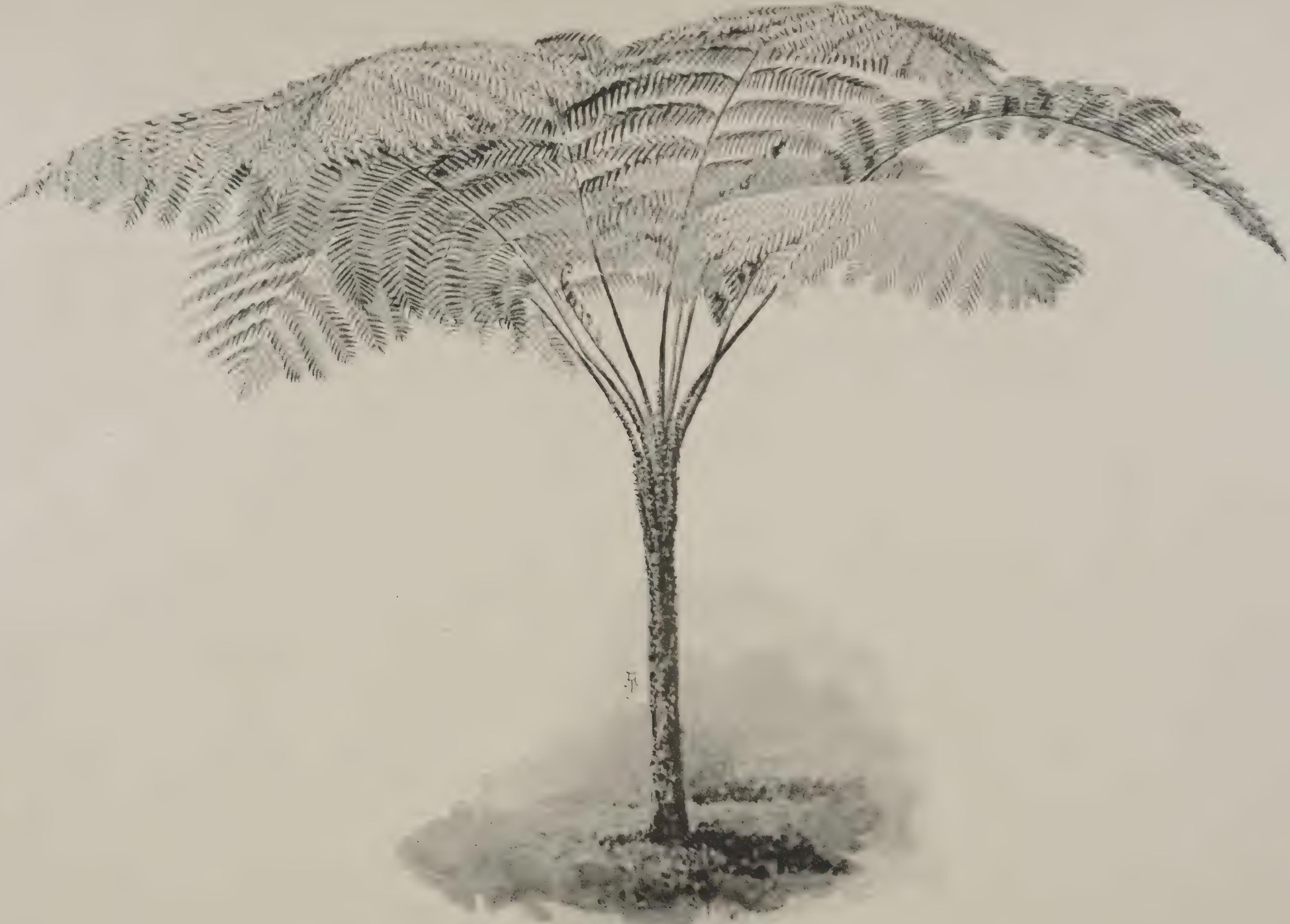
A. P. fraxinifolia—frax-in-if-ol′-ĭ-a (Ash-leaved), *Raddi*.

A variety with fronds seldom exceeding 1½ft. in length, including the somewhat hairy stipes (stalks) on which they are borne. Their barren part consists of a terminal leaflet and of eight or nine pairs of lateral ones; these are entire, egg-shaped, 2½in. long, 1in. broad, and closely set together. The fertile portion, composed of short, contracted segments produced in pairs from the base of the lower pinnæ (leaflets), forms a very dense panicle about 9in. high, light green in its young stage, but turning with age to a peculiar light brown colour.

A. P. lineata—li-nĕ-a′-ta (lined), *Moore*.

This singular variety differs from the species only through the yellowish-green central stripe extending to the end of the pinnæ (leaflets) in all the fronds.—*Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. P. plumbea—plum′-bĕ-a (leaden-grey). A synonym of *A. P. tessellata*.



Alsophila armata

(much reduced).

A. P. tessellata—tes-sel-la′-ta (tessellated), *Moore.*

This peculiar and handsome variety, also known as *A. P. plumbea*, is distinct from all others on account of its fronds, which grow about 20in. high, including their upright, slightly hairy stalks. The pinnæ (leaflets) are dark green, with a bright green centre and a leaden-grey border ; they are further ornamented with mottled, transparent, greenish-yellow blotches and veins on the upper surface, which markings and nettings give the fronds the appearance of a charmingly attractive piece of mosaic. As in the parent plant, the pinnæ number from four to twelve pairs, besides the terminal one ; but they are of smaller dimensions, measuring only 2in. to 3in. long by scarcely 1in. broad. Another peculiarity of this variety is the tendency which it often has to produce from the base of the lower pair of pinnæ three fertile segments instead of a pair.—*Nicholson*, *Dictionary of Gardening*, i., p. 73.

A. radicans—ra-di′-cans (rooting). Synonymous with *A. caudata.*

A. repens—re′-pens (creeping). Synonymous with *A. hirsuta.*

A. rotundifolia—rot-un-dif-ol′-ĭ-a (round-leaved), *Schrader.*

A stove species, native of South Brazil, having fronds borne on upright, slender stipes (stalks) which are 6in. to 9in. long and hairy in their young state. It is also distinct from nearly all other known species through the barren portion of the frond, 8in. to 12in. long and 1in. to 2in. broad, being frequently prolonged and rooting at its extremity. This barren portion consists of from eight to twelve pairs of distantly-placed, almost leathery pinnæ (leaflets) 1in. long, $\frac{3}{4}$in. broad, very blunt, with their lower side obliquely truncate (terminating abruptly) at the base, their outer edge finely toothed, and their surfaces and rachis (stalk of the leafy portion) finely hairy. The fertile portion is composed of short, contracted segments, disposed in a panicle 2in. to 3in. long, borne on a slender stalk 3in. to 4in. long. —*Hooker*, *Synopsis Filicum*, p. 432.

A. rutæfolia—ru-tæ-fol′-ĭ-a (Rue-leaved), *Martius.*

This stove species, native of South Brazil, which somewhat resembles *A. adiantifolia* in general appearance, has its fronds, equally produced from a slowly-creeping rhizome (prostrate stem), borne on firm, naked stalks 6in. to 9in. long. Their barren portion is bi- or tripinnatifid (twice or three times divided half-way to the midrib), 2in. to 3in. long, and 1in. to 1½in. broad: it is composed of pinnæ (leaflets) of almost leathery texture, slightly hairy, somewhat distantly placed, spear-shaped, and cut down nearly to the rachis (stalk of the leafy portion) into narrow, toothed or slightly pinnatifid divisions. This species is distinguished from all others by the sub-sessile (almost stalkless) nature of its fertile portion, which is situated at the base of the barren one, and formed of short, contracted segments disposed in a close panicle seldom more than 1½in. long.—*Hooker*, *Synopsis Filicum*, p. 434.

A. (Anemidictyon) Schraderiana—An-e′-mid-ic′-tў-on; Schra-der-ĭ-a′-na (Schrader's) *Martius.*

A stove species, native of South Brazil, with fronds borne on stipes (stalks) 6in. to 9in. long and hairy at their base. The barren portion, 3in. to 5in. long and broad, is composed of two or three pairs of pinnæ (leaflets) 2in. to 2½in. long, 1in. broad, with a wedge-shaped base, and of a terminal pinna, showing two lanceolate (spear-shaped) lobes, which are of a somewhat leathery texture, and have a midvein extending to their extremity. Their fertile portion is formed of contracted, short segments, disposed in a panicle 1in. to 2in. long, and borne on a stalk 1in. to 4in. long.—*Hooker*, *Synopsis Filicum*, p. 434.

A. Seemanni—See-man′-ni (Seemann's). Synonymous with *A. oblongifolia*.

A. tomentosa—to-men-to′-sa (woolly), *Swartz.*

This handsome species, which is also known in gardens under the names of *A. cheilanthoides*, *A. deltoidea*, *A. flexuosa*, and *A. villosa*, and which thrives equally well under either greenhouse or stove treatment, has a wide range of habitat, extending from Mexico and the West Indies to Peru and Monte Video. It has a very singular appearance, produced by the rusty-coloured hairs with which its strong, upright stipes (stalks), 6in. to 12in. long, are densely clothed. The barren portion of the frond is 6in. to 12in. long, and about half as broad, sometimes bipinnatifid (twice divided half-way to the midrib), or bipinnate (divided twice quite to the midrib), and furnished with pinnæ (leaflets) of almost leathery texture and densely hairy on both surfaces, a character which is also shared by their rachis (stalk of the leafy portion). The lowest pinnæ (leaflets) are the largest, and show blunt lobes often ¾in. long and ¼in. broad, nearly uncut. The fertile portion is composed of contracted segments disposed in a loose panicle 4in. to 9in. long, and borne on a stalk only 1in. to 2in. in length. See Plate.—*Hooker, Synopsis Filicum*, p. 433. *Nicholson, Dictionary of Gardening*, i., p. 74.

A. trichorhiza—trich-ŏ-rhi′-za (having hair-like roots), *Gardner.*

A very distinct, stove species, native of Brazil. Its fronds, produced from a crown covered with a dense tuft of bright red-brown scales of a particularly fibrillose (hair-like) nature, are borne on stipes (stalks) 1in. to 2in. long, densely covered on their whole length with a white substance of a woolly nature. Their barren portion, 2in. to 3in. long, 1in. to 1½in. broad, and bipinnate (twice divided to the midrib), is furnished with spreading, spear-shaped, closely-set pinnæ (leaflets), subdivided into several close, roundish or oblong pinnules (leafits) of a leathery texture, both sides of which when young are completely enveloped in dense, wool-like material. The nearly stalkless fertile portion is disposed at the base of the barren one.—*Hooker, Synopsis Filicum*, p. 434.

A. (Anemidictyon) Tweediana—An-e′-mid-ic′-tȳ-on ; Tweed-ĭ-a′-na (Tweed's), *Hooker.*

This stove species, of particularly small dimensions, is a native of Uruguay and South Brazil. Its short fronds, borne on naked or very slightly hairy stipes (stalks), have their barren portion 1½in. to 2in. long by 1in. broad, and simply pinnate (once only divided to the midrib): they are furnished with two or three pairs of sessile pinnæ (stalkless leaflets) of almost leathery texture, oblong in shape, ¾in. long, ½in. broad, with rounded base, blunt point, and edge conspicuous through its round notches. The fertile portion is composed of contracted, short segments disposed in a panicle 1in. to 2in. only in length, with lower branches very short, and borne on a stalk not more than 2in. high, generally shorter.—*Hooker, Synopsis Filicum*, p. 434.

A. villosa—vil-lo′-sa (hairy). Synonymous with *A. tomentosa.*

A. (Coptophyllum) Wrightii—Copt-oph-yl′-lum ; Wright′-i-i, *Baker.*

This stove species, which in general habit is somewhat like *A. cuneata*, or like a small, slender form of *A. adiantifolia*, is a native of Cuba. It has barren and fertile fronds totally distinct, and borne on separate stipes (stalks). The former, borne on slender, naked, straw-coloured stalks 1in. to 5in. long, are tripinnatifid (three times divided half-way to the midrib), and 2in. to 3in. long by 1½in. to 2in. broad; their few leaflets are disposed some little distance apart, and subdivided into pinnules (leafits), the upper ones wedge-shaped, simple, ⅛in. broad, the lower ones deeply cleft from the circumference inwards. The texture of the pinnules is almost leathery, and their surfaces, like their rachis (stalk of the leafy portion), are quite naked. The fertile frond, produced separately, is composed of contracted segments disposed in a panicle 2in. to 3in. long, very loose and few-branched, borne on a stalk 8in. to 12in. long.—*Hooker*, *Synopsis Filicum*, p. 435.

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ANEMIDICTYON—An-e′-mid-ic′-ty̆-on. *See* **Anemia**.

ANETIUM—An-e′-tĭ-um. *See* **Hemionitis**.

CHAPTER XXIV.

ANGIOPTERIS, *Hoffmann.*

(An-gi-op′-ter-is.)

ALTHOUGH above sixty kinds of *Angiopteris* are enumerated by Moore in his "Index Filicum," only one of these has been recognised by Hooker and Baker as possessing sufficiently defined characters to rank as a species: all others usually known in gardens as distinct species are simply varieties of it. This genus, which derives its name from *aggeion*, a vessel, and *pteris*, a wing, and forms in the "Synopsis Filicum" Genus 69, belongs to the Sub-order *Marattiaceæ*, which is composed of *Angiopteris*, *Danæa*, *Gymnotheca*, *Kaulfussia*, and *Marattia*. It is formed exclusively of Ferns with fronds of large dimensions, and rising in a peculiar manner from between two fleshy appendages. Their veins, either simple or forked, are free (not running into one another). The fructification consists of sessile (stalkless) capsules, opening by a slit on the inner side; they are biseriate (disposed in two rows), eight to fifteen to each pinna (leaflet), set very close to one another, but not concrete, and arranged in linear-oblong sori (boat-shaped spore masses) near the edge of the frond, almost hiding the inferior fringed involucre or covering.

Culture.

All the known forms of *Angiopteris* are of particularly robust habit, and are found growing naturally in swampy places, most of them all over

Ceylon, Java, and the Pacific Islands. They are therefore exceedingly useful for adorning the warm Fernery all the year round, and the cool Fernery during the summer months. Whether grown in pots or planted out, they should be kept in a mixture of two parts fibrous loam, two parts rough peat, one part chopped sphagnum, and one part coarse sand: in this compost they thrive luxuriantly, provided that at all times they receive a liberal supply of water at the roots and are allowed plenty of room to fully expand their gigantic foliage. When they are grown in pots, the same mixture should be used, but it is a good plan to keep the pots partly in water to the depth of 2in. or 3in.

Although spores of *Angiopteris* are frequently and freely produced, there is no record of any seedlings of these noble Ferns having ever been raised in England, or indeed in any other country in Europe. The propagation of these plants is usually left to their natural disposition of frequently producing at the base of their fronds, young plants, which, when sufficiently developed, may be detached without trouble. The most expeditious way of increasing Angiopteris, however, is by means of the scaly appendages with which the base of each frond is surrounded. Each of these fleshy scales contains at least two dormant buds, which, under the influence of heat and constant moisture, soon develop into subjects in all respects similar to the parent plant. The scales should be detached in their entirety and not cut up, then laid in silver sand, covered over with chopped sphagnum, and kept in a close propagating case. Though this may be done at almost any season of the year, the months of February and March are the time most appropriate to such a mode of propagation, which always proves all the more rapid when done early in the spring. According to the season in which this operation is performed, it is known that from three to five months usually elapse before the first indications of growth may be noticed; but after they have made a decided start, these young bulbils rapidly gain in strength, and may soon be considered as so many independent subjects.

A. evecta—e-vec′-ta (exalted), *Hoffmann.*

This, the only recognised species, which is found all over the tropics of the Old World, in Madagascar, in New Caledonia, in Queensland, and from Japan to Ceylon, is also, according to Beddome, very common in most sub-alpine jungles on the western side of the Madras Presidency, up to 4000ft. and even 5000ft. elevation. It has very handsome fronds, which impart to a Fernery of sufficient size to accommodate them, a noble and tropical appearance, but it is very unlike a Fern in general aspect. The fronds reach, with their stipes (stalks), 18ft. in length by 10ft. in breadth ; they are produced from a thick, fleshy crown, forming in time a sort of caudex (stem) 2½ft. high and 1½ft. to 2ft. thick, and are borne on stout, blackish, fleshy stalks. The base of the stalk is swollen, often measuring 8in. in circumference, and articulated (jointed), and is furnished with two large, leathery auricles (ear-like flaps), which remain attached to the stem after the fronds have fallen. The fronds are bipinnate (twice divided to the midrib), with spreading pinnæ (leaflets) 1ft. to 3ft. long, the lowest the largest, and have their rachis (stalk of the leafy portion) swollen at the base. The pinnules (leafits) are of a leathery texture, bright shining green on both sides, from 4in. to 12in. long and from 1in. to 1½in. broad, boat-shaped, and either stalkless or very short-stalked (Fig. 55) ; their edge

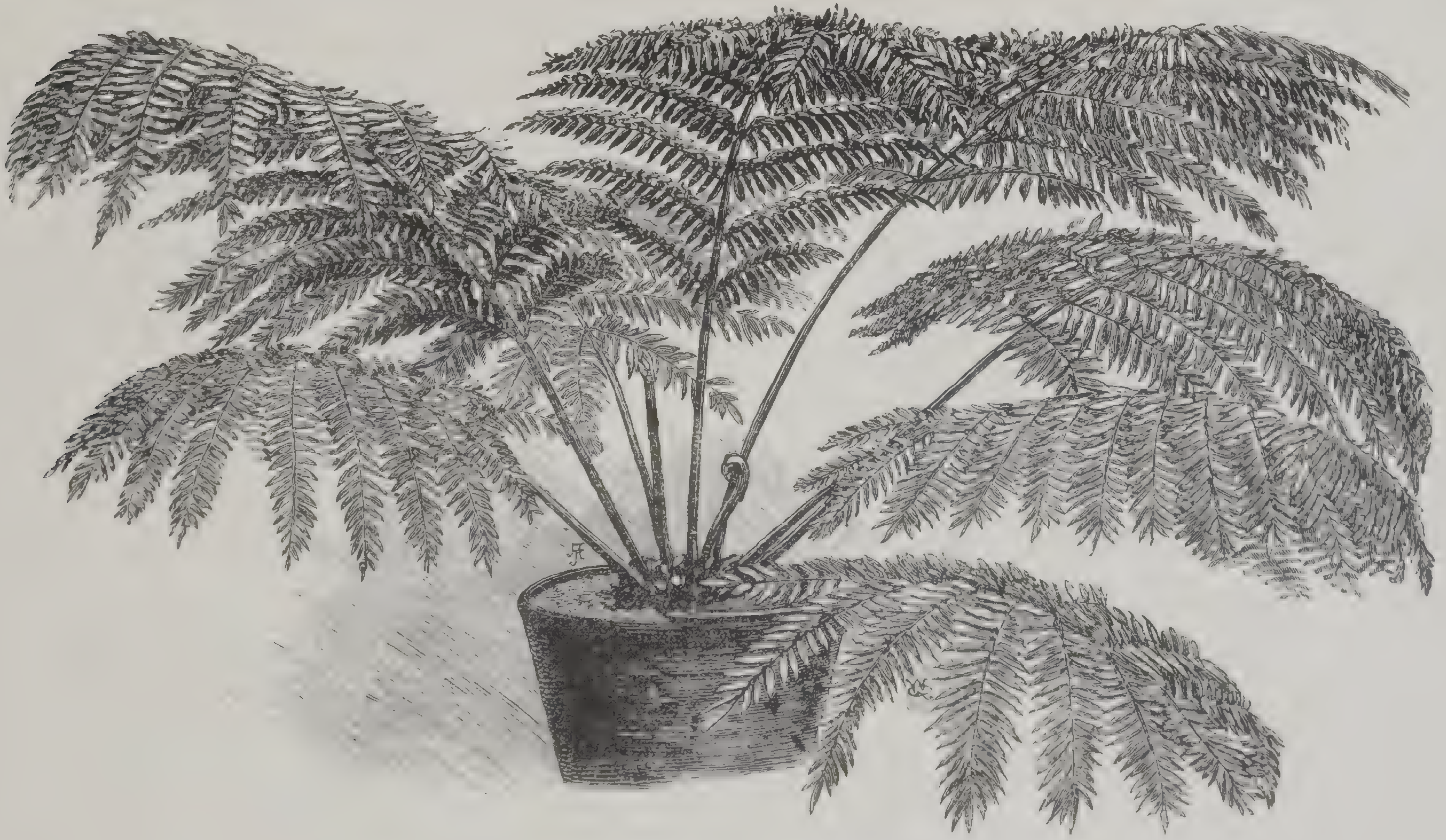


Fig. 55. Angiopteris evecta
(much reduced).

is entire or slightly toothed, and they terminate in a tapering point. The sori (spore masses) are oblong in form, and consist of from eight to fifteen capsules to each pinnule: they are disposed near the edge, where they form a broad, marginal, and laterally continuous row.—*Hooker*, *Synopsis Filicum*, p. 440. *Nicholson*, *Dictionary of Gardening*, i., p. 78. *Lowe*, *Ferns British and Exotic*, viii., t. 75. *Beddome*, *Ferns of Southern India*, t. 78.

The considerable range of variation existing in the texture of the fronds of *Angiopteris*, and also of the more or less close disposition of the veins and of the sori (spore masses), as well as the variable number of the capsules of which the latter are composed, are so many characters which have induced some authors to determine numerous forms as distinct species. It is thus that, besides Miquel's *A. angustata*, from Java; *A. Arnottiana*, from India; Brackenridge's *A. attenuata*, from the Society Islands; Wallich's *A. crassipes*, from India; Desvaux's *A. indica*, also from India; Hooker's *A. longifolia*, from the Society Islands; *A. magnifica*, from Ceylon; Kunze's *A. pruinosa*, from Java, and *A. Willinkii*, from Java, Presl defines as distinct species the following:

A. angustifolia, Philippine Islands.
A. commutata, Society Islands.
A. distans, India.
A. Helferiana, India.
A. Hugeliana, India.
A. latifolia, India.
A. macrocephala, India.
A. muricata, Borneo.
A. similis, Java.
A. Wallichiana, India.

De Vriese also defines sixty species, the most striking of which are the following:

A. acrocarpa, Society Islands.
A. amboinensis, Amboyna.
A. ankolana, Sumatra.
A. aphanosorus, Sumatra.
A. approximata, Sumatra.
A. assamica, Assam.
A. aurata, New Zealand.
A. Beecheyana, Caroline Islands.
A. Brongniartiana, Tahiti.
A. camptophlebia, India.
A. caudata, Philippine Islands.
A. cochinchinensis, Cochin China.
A. crassifolia, Java.
A. cupreata, Society Islands.
A. cuspidata, Java.
A. Dregeana, Java.
A. D'Urvilleana, Society Islands.
A. Godichaudiana, India.
A. Griffithiana, Mergui.
A. Hartingeana, Java.
A. Hookeriana, India.
A. hypoleuca, Java.
A. laciniata, India.
A. Lasegueana, Huachine.
A. Leschenaultiana, Ceylon.
A. macrophylla, India.
A. madagascariensis, Madagascar.
A. marginata, Ceylon.

A. microsporangia, Sumatra.
A. Miqueliana, Java.
A. pallescens, Sumatra.
A. plagiocarpa, Ceylon.
A. polysporangia, Ceylon.
A. Presliana, Java.
A. punctata, Ceylon.
A. repandula, India.
A. salicifolia, India.
A. suboppositifolia, Ceylon.
A. sylhetensis, India.
A. Teyesmaniana, Java.
A. uncinata, Amboyna.
A. Wightiana, India.

The characters which have led to the classification by their respective authors of the foregoing kinds as distinct species, as well as the free veinlet of variable length and distinctness which in many of these forms is observed to begin at the edge of the frond, and is situated in the interspace between the veins proper, are of too superficial a nature and far too variable to be of any value in giving these plants rank as distinct species, and they must all be considered as simply forms of *A. evecta* of Hoffmann.

* * *

ANISOCAMPIUM—An-is-oc-amp′-ĭ-um. *See* **Nephrodium.**
ANISOGONIUM—An-is-og-o′-nĭ-um. *See* **Asplenium.**
ANOGRAMME—An-og-ram′-me. *See* **Gymnogramme.**
ANTIGRAMME—An-tig-ram′-me. *See* **Scolopendrium.**

CHAPTER XXV.

ANTROPHYUM, *Kaulfuss.*

(An-troph′-y̆-um.)

THIS genus, which derives its name from *antron*, a cavern, and *phuo*, to grow, in allusion to the places of growth or natural habitats of the species contained in it, forms Genus 55 in Hooker and Baker's "Synopsis Filicum," and is a sub-division of Tribe 12, *Grammitideæ*, which, besides the genera *Gymnogramme* and *Nothochlæna*, is composed of mostly strange-looking Ferns, such as *Brainea*, *Hemionitis*, *Tænitis*, *Vittaria*, &c. *Antrophyum* is formed of closely-allied species, almost restricted to the tropics, all with simple (undivided) fronds of various forms, but of a firm, yet fleshy texture.

The distinguishing characters of *Antrophyum* consist in the presence on the fronds of numerous uniform, hexagonal areolæ (six-sided, distinctly marked-out spaces), and also in the disposition of the sori (spore masses), which are carried along the veins, and imperfectly reticulated (forming an irregular and imperfect network). In some species these sori are sunk in a totally distinct groove: in others they are superficial or slightly immersed (embedded) in the fronds.

Culture.

Although most Antrophyums are very interesting in themselves, only a few of them can be considered as really decorative Ferns when grown in pots; though when planted out in the warm Fernery they make very distinct objects, and are especially valuable for growing in comparatively dark places. All are of small, or at the most of medium dimensions, and not rapid growers by any means, but their fronds possess very lasting qualities, and consequently the plants are at all times well furnished with foliage. Their propagation may be effected by means of the spores, which are produced in abundance; but this being a very slow process, they are usually increased by the division of their crowns, an operation which proves most satisfactory when done in March or April.

Principal Species and Varieties.

A. Boryanum—Bo-rÿ-a′-num (Bory's), *Kaulfuss.*

A very distinct, stove species, also known as *A. obtusum*, native of the Mauritius, Bourbon, and Johanna Islands. The stout, compressed stipes (stalks), 1in. to 4in. long, gradually merge into the fronds, which are 6in. to 12in. long, 2in. to 4in. broad, and show no distinct midrib. These fronds are broadest half or one-third of the way down, their edge is entire, and while their extremity is sometimes pointed and sometimes blunt, their lower part is very gradually narrowed. The areolæ (distinctly marked-out spaces on their surface) are vertical, ½in. long, and ¼in. broad, and the slender sori (spore masses) are often united.—*Hooker, Synopsis Filicum*, p. 394.

A. Brookei—Broo′-kĕ-i (Brooke's). Synonymous with *A. subfalcatum.*

A. callæfolium—cal-læ-fol′-ĭ-um (Calla-leaved). This is synonymous with *A. Cumingii.*

A. cayennense—cay-en-nen′-sĕ (from Cayenne), *Kaulfuss.*

A stove species, native of Guiana and the Amazon Valley, and readily distinguished from most other species through the distinct and prominent midrib, which extends from the base to the extremity of its rather firm fronds. These, borne on stipes (stalks) 1in. to 4in. long, are 6in. to 9in. long, 1in. to 1½in. broad, oblong-spear-shaped, being narrowed at both ends, with their edge entire and thickened. The areolæ are oblique, half as broad as long, and the nearly superficial sori (spore masses) are often forked.—*Hooker, Species Filicum*, v., p. 172. *Nicholson, Dictionary of Gardening*, i., p. 89.

A. coriaceum—cor-ĭ-a′-cĕ-um (leathery), *Wallich.*

A stove species, native of the Himalayas, and the Philippine and the Malayan Islands. Its fronds, 6in. to 8in. long and ½in. to ¾in. broad, are of very thick texture and show no distinct midrib: they are gradually narrowed from the centre to the base, and are very pointed at their extremity. The long and narrow areolæ are distinctly raised on the upper surface of the fronds, and the sori (spore masses), which are quite immersed (embedded) in it, are sometimes confluent or gradually united.—*Hooker*, *Species Filicum*, v., p. 163. *Nicholson*, *Dictionary of Gardening*, i., p. 89.

A. c. nanum—na′-num (dwarf), *Fée.*

In this variety the fronds are quite as leathery in texture as in the type, but much smaller and spathulate (spoon-shaped).—*Hooker*, *Synopsis Filicum*, p. 393.

A. Cumingii—Cum-ing′-ĭ-i (Cuming's), *Feé.*

The fronds of this stove species (also known as *A. callæfolium)*, native of the Philippine Islands, are about 1½ft. long, a little more than 1in. broad, and of a somewhat soft texture: they are ligulate (strap-shaped), though narrowed very gradually to the base, and show a distinct, black midrib in the lower quarter of their length. The central areolæ are of a singular shape, being several inches long and not more than one line broad, and the very slender and deeply-sunk sori (spore masses) are often united, while the edge of the furrow is rather raised.—*Hooker*, *Species Filicum*, v., p. 167.

A. ensiforme—en-sif-or′-mĕ (sword-shaped), *Hooker.*

A stove species, native of Mexico and Guatemala, whose fronds, 6in. to 12in. long and ½in. to 1in. broad, are strap-shaped, but sharply pointed at their extremity, and very gradually narrowed from half-way down to their base; the midrib, which is broad at the base, becomes gradually invisible upwards, and the veins, sunk in the texture of the fronds, form three or four rows of irregular areolæ (distinctly-marked spaces on their surface) situated between the midrib and the edge. The sori (spore masses) are linear-vermiform (worm-shaped), raised above the surface of the fronds, and often forked.—*Hooker*, *Species Filicum*, v., p. 174.

A. giganteum—gig-ant-e′-um (gigantic), *Bory.*

The fronds of this robust-growing, stove species, native of the Mauritius and Bourbon Islands, which frequently attain 1½ft. in length, are 3in. to 4in. broad, broadest one-third of the way down, and narrowed gradually to a short, very stout stem. They are of a very thick texture, and their edge is furnished with an entire border of a cartilaginous (gristly) nature; their surface is covered with close and fine areolæ affecting a vertical position, ¼in. long and one line broad. The sori (spore masses) are slender and often united.—*Hooker*, *Species Filicum*, v., p. 174.

A. immersum—im-mer′-sum (embedded), *Mettenius.*

A small-growing, stove species, native of the Mauritius, Bourbon, and Malay Islands, and also known as *A. pumilum.* Its fronds, of a thick texture and seldom more than 4in. long by ¾in. broad, are narrowed gradually upwards to a sharp point and to a short stem at their base; they show no distinct midrib, and their veins are conspicuously raised on the upper surface, where they form long and narrow areolæ, the central one of which affects a vertical position. The sori (spore masses), often forked in this species, are quite immersed (embedded in the texture of the fronds).—*Hooker*, *Species Filicum*, v., p. 170.

A. lanceolatum—lan-cĕ-ol-a′-tum (spear-shaped), *Kaulfuss.*

The habitat of this distinct, stove species extends from the West Indies and Mexico southwards to New Granada. The fronds, of a papery texture, and furnished with a slender, yet distinct, raised midrib throughout, are 1ft. or more long, ½in. broad, sharply pointed at their extremity, but very gradually narrowed towards their base from the lower half. The areolæ, which occupy a vertical position, are twice or three times as long as broad, and are disposed in about three rows between the midrib and the edge of the fronds. The slender and superficial sori (spore masses) are often united. —*Hooker*, *Species Filicum*, v., p. 176. *Nicholson*, *Dictionary of Gardening*, i., p. 89.

A. latifolium—la-tif-ol′-ĭ-um (broad-leaved), *Blume.*

A stove species, native of Java and Bhotan, of a singular appearance, produced by the stout, compressed stipes (stalks), 3in. to 6in. long, widening gradually into the fronds, the leafy portion of which, 4in. to 6in. long by 3in. to 4in. broad, has its extremity cuspidate (gradually tapering into a sharp, stiff point), and is very gradually narrowed towards the base. The edge is entire, and there is no distinct midrib, while the areolæ, though 2in. to 3in. long, are only $\frac{1}{8}$in. broad. The stout and copious sori (spore masses) are rarely united.—*Hooker*, *Species Filicum*, v., p. 172.

A. latipes—la′-tip-ēs (large-footed). A synonym of *A. semicostatum.*

A. Lessonii—Les-so′-nĭ-i (Lesson's). Synonymous with *A. plantagineum.*

A. lineatum—li-nĕ-a′-tum (lined), *Kaulfuss.*

This singular, stove species, with which *A. Polytænium* is identical, is a native of Cuba, Mexico, and Brazil, and is one of the most distinct of all those known or described. Its fronds, 6in. to 12in. long and only $\frac{1}{4}$in. to $\frac{1}{2}$in. broad, are abundantly produced, and form a mass of ribbon-like foliage. They have their edge entire and their summit sharply pointed, but their lower half is gradually narrowed to the base; they possess the habit of *Vittaria*, and show a distinct, slender, raised midrib throughout. The areolæ are very long and narrow, and the sori (spore masses), sunk in deep furrows with raised edges, are disposed in two or three almost continuous lines on each side of the midrib, with which they run parallel.—*Hooker*, *Species Filicum*, v., p. 175.

A. Mannianum—Man-nĭ-a′-num (Mann's), *Hooker.*

A stove species, native of the Guinea Coast, and particularly distinct through the thin texture of its peculiarly egg-shaped or roundish fronds, 6in. to 9in. long and nearly as broad: these are borne on slender, blackish, curved stipes (stalks) 6in. to 9in. long; they are cuspidate (gradually tapering to a very sharp point) at their extremity, but broadly wedge-shaped at their base, and their edge is entire or sometimes slightly uneven. There is no indication of any distinct midrib, and the areolæ on the surface of the fronds, 1in. to 2in. long by $\frac{1}{8}$in. broad, show a peculiar disposition as they radiate from the base to the circumference. The slender and copious sori (spore masses) are often united.—*Hooker*, *Species Filicum*, v., p. 173.

A. niphoboloides—niph-ob′-ol-ŏ-i′-dēs (Niphobolus-like), *Hooker*.

This singular, stove Fern, native of Northern India, the Philippines, and the Malaccas, though described under that name by Hooker in his "Species Filicum," vol. v., p. 94, is synonymous with *Niphobolus floccigerum* of Mettenius, equally described in the same volume at page 45.—*Hooker, Synopsis Filicum*, p. 351.

A. obtusum—ob-tu′-sum (blunt). Synonymous with *A. Boryanum*.

A. parvulum—par′-vul-um (rather small). A variety of *A. plantagineum*.

A. plantagineum—plan-ta-gin′-ĕ-um (resembling Plantago or Rib Grass), *Kaulfuss*.

This stove species, with which *A. Lessonii* is identical, has a wider range of habitat than most others, as it is found in Ceylon, the Himalayas, and Malay, also in the Philippine and Polynesian Islands. Its fronds, 6in. to 9in. long and 1½in. to 2in. broad, are of a thick and coriaceous (leathery) texture, broadest one-third of the way down, and while their extremity is sharply pointed, their lower part is gradually narrowed into a stem 1in. to 4in. long. There is no midrib apparent, and the areolæ, though sometimes 3in. long, are only ⅛in. broad. The copious sori (spore masses) are deeply immersed (embedded) in the texture of the fronds, and are frequently uniting. See Fig. 56 (reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author).—*Hooker, Species Filicum*, v., p. 170. *Beddome, Ferns of Southern India*, t. 52.

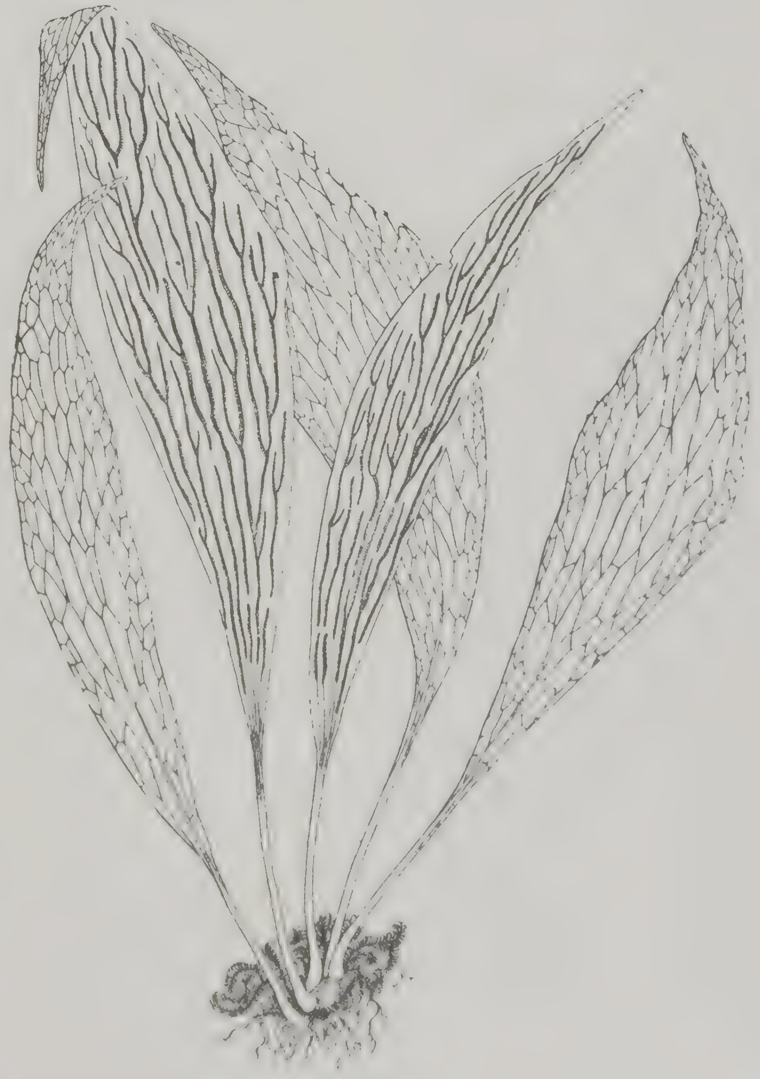


Fig. 56. Antrophyum plantagineum (½ nat. size).

A. p. angustatum—an-gus-ta′-tum (narrow), *Brackenridge.*

The fronds of this variety are of thinner texture, ligulate (strap-shaped), about 1ft. long by ¾in. broad, and borne on stipes (stalks) 6in. long.—*Hooker*, *Synopsis Filicum*, p. 393.

A. p. parvulum—par′-vul-um (rather small), *Blume.*

This only differs from the foregoing species, of which it no doubt is a variety, through its fronds being shorter and also narrower.—*Hooker*, *Synopsis Filicum*, p. 393.

A. Polytænium—Pol-yt-æ′-nĭ-um (having many ribbons). Synonymous with *A. lineatum.*

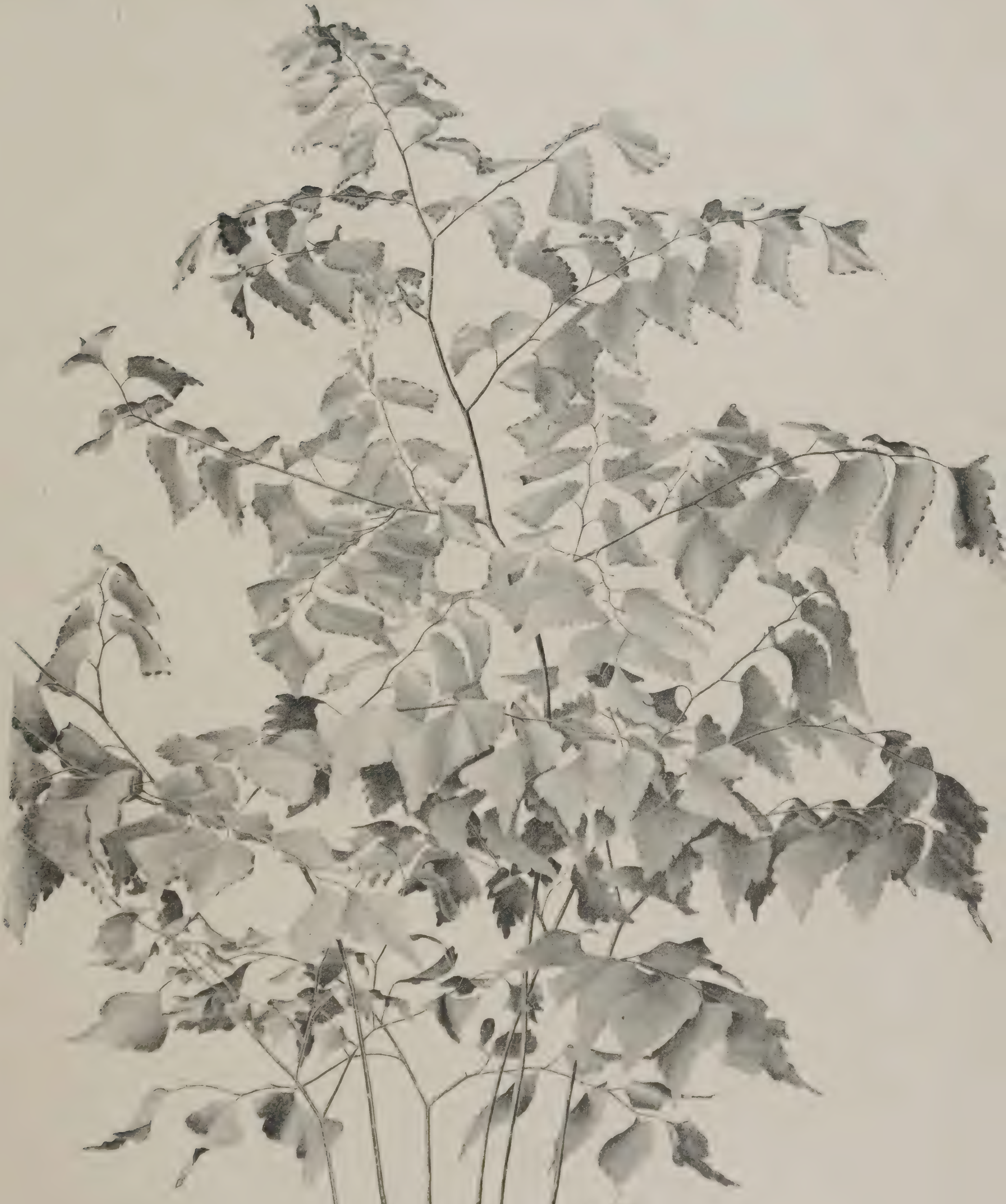
A. pumilum—pu′-mil-um (small). A synonym of *A. immersum.*

A. reticulatum—re-tic-ul-a′-tum (netted), *Kaulfuss.*

A stove species, native of the Himalayas, Ceylon, and the Malaccas, extending to Aneitum and Queensland. Its fronds, 6in. to 15in. long, 1½in. to 2in. broad, and showing scarcely any midrib, are broadest about one-third of the way down; their extremity is sometimes blunt and at other times sharply pointed, but their lower part is very gradually narrowed to the base, where it terminates in a short, compressed stem. The areolæ (distinctly marked-out spaces on the surface of the fronds), although several inches long, are only $\frac{1}{12}$in. to ⅛in. broad; they are very distinctly raised on the upper surface. The sori (spore masses), equally raised above the surface of the fronds, are copious and often united.—*Hooker*, *Species Filicum*, v., p. 169. *Beddome*, *Ferns of Southern India*, t. 231.

A. semicostatum—se-mic-os-ta′-tum (half-ribbed), *Blume.*

This somewhat strong-growing, stove species, also known as *A. latipes*, is a native of Ceylon, the Malacca, Philippine, and Polynesian Islands. It produces fronds fully 1½ft. long and 3in. to 4in. broad, broadest about one-third of the way down, narrowed to a sharp point at their extremity, and very gradually narrowed to the base into a short stem; their edge is entire, and they are provided in their lower half with a distinct, blackish midrib. Their central areolæ, often 3in. long, are seldom more than ⅛in. broad, and the sori (spore masses), often united and copious, are raised well above the surface of the fronds.—*Hooker*, *Species Filicum*, v., p. 168.



Adiantum trapeziforme

(¼ nat. size).

A. subfalcatum—sub-fal-ca′-tum (nearly sickle-shaped), *Brackenridge.*

A stove species, native of Borneo, Fiji, and the Samoan Islands, also known as *A. Brookei.* Its fronds are 6in. to 12in. long, ¼in. to ½in. broad, and terminate in a sharp point, but are very gradually narrowed to the base on their lower half, which is also provided with a somewhat indistinct midrib. The areolæ are vertical, and disposed about two on each side of the midrib, and are several times longer than broad. The sori (spore masses) are moderately immersed (embedded) in the texture of the fronds, and hardly unite; they are disposed in two or four long, interrupted lines.—*Hooker, Species Filicum,* v., p. 175.

A. subsessile—sub-ses′-sil-ĕ (nearly stalkless), *Kunze.*

This stove species, whose habitat extends from Cuba and Guatemala to Peru, produces fronds 6in. to 12in. long, 1in. to 1½in. broad, of a firm texture, and with a conspicuously-raised midrib, distinct from the base to the extremity. They are broadest one-third of the way down, and are narrowed gradually to the base and to the summit, which is sharp-pointed. The areolæ shown on their surface are oblique, and about twice as long as broad. The sori (spore masses) are often forked, and nearly superficial.—*Hooker, Species Filicum,* v., p. 171.

* * *

ARTHROPTERIS — Arth-rop′-ter-is. *See* **Nephrodium** *and* **Nephrolepis.**

CHAPTER XXVI.

ASPIDIUM, *Swartz.*

(As-pid′-ĭ-um.)

Buckler or Shield Ferns.

THE name of this popular genus is derived from *aspidion*, a little buckler or shield, in allusion to the form of the indusium or covering of its sori (spore masses). *Aspidium* is Genus 43 of Hooker and Baker's "Synopsis Filicum," and it forms a very interesting portion of the tribe *Aspidieæ*. It is a genus of a particularly cosmopolitan nature, comprising, as it does, several British as well as numerous exotic species, and showing a very extensive variation as regards size, texture, cutting, and venation. Thus we have in the same genus some species, such as *A.* (*Polystichum*) *lachenense* and *A.* (*P.*) *Thomsoni*, of small, and others, such as *A.* (*P.*) *anomalum* and *A.* (*P.*) *ascendens*, of gigantic, dimensions; and though the majority of Aspidiums are, like all the known *Cyrtomiums*, of a particularly coriaceous (leathery) texture, some kinds, such as *A.* (*Polystichum*) *glandulosum*, *A.* (*Cyclopeltis*) *semicordatum*, *A.* (*Polystichum*) *sikkimense*, and others, are nevertheless remarkable for the softness of their foliage. Again, a great contrast exists between species like *A.* (*Polystichum*) *fœniculaceum*, *A.* (*P.*) *laserpitiifolium*, and *A.* (*P.*) *multifidum*, with finely-divided, and others with broad, fronds, such as *A.* (*Euaspidium*) *platanifolium*, *A.* (*E.*) *trifoliatum*, &c.; and while their veins in certain groups are all free, in others they are either pinnate (divided to the midrib) or united, and even anastomosing (intermixed).

The distinguishing characters of the genus *Aspidium* reside partly in the disposition of the sori (spore masses), which are sub-globose (almost spherical), dorsal (attached to the back), and terminal on the veinlets, and partly in the presence of an orbicular involucre (covering) common to all the species alike, and which is fixed to the frond by the centre.

The following are the groups of which the genus *Aspidium* is composed:

1.—CYCLODIUM (Cy-clo′-dĭ-um), *Presl.* The fronds of the plants belonging to this small group have their veins pinnate (divided to the midrib), the opposite veinlets usually joining.

2.—CYRTOMIUM (Cyr-tom′-ĭ-um), *Presl.* The veins in the plants of this group sometimes, but not invariably, unite slightly towards the edge.

3.—EUASPIDIUM (Eu-as-pid′-ĭ-um), *Schott.* Plants with veins copiously anastomosing (freely intermixed).

4.—POLYSTICHUM (Pol-ys′-tich-um), *Roth.* This group, by far the most important in the genus, consists of plants readily distinguished by their veins, which are all free, as also by the more or less leathery texture of the fronds of nearly all the species, and by the peculiar character of their teeth, which are usually awned (terminating in a stiff, bristle-like appendage, which is evidently a prolongation of the midnerve). This group is, for botanical purposes, divided into four sections as follows:

Section I.—Species whose fronds are only pinnatifid (divided only half-way to the midrib).

Section II.—Species with fronds once pinnate (divided to the midrib), the lower pinnæ (leaflets) being either entire (undivided) or pinnatifid only below.

Section III.—Species having their lower pinnæ once pinnate.

Section IV.—Species in which the lower pinnæ are more than once pinnate.

The geographical distribution of the Buckler or Shield Ferns is very extensive, for many of them are found in Japan, others in the East and in the West Indies, while Tropical and also North America supply us with some of the most distinct kinds belonging to the group *Polystichum.* Even New Zealand comes in for its share of *Aspidium*, and the genus is handsomely represented at home by the common Prickly Shield Fern, *A.* (*P.*) *aculeatum*, and its remarkable form, *lobatum*; the latter is so thoroughly distinct that it has by several authorities been elevated to the rank of species, for its consistency has never been noted anywhere to have assumed under cultivation the form of *A. aculcatum. A.* (*P.*) *angulare*, or as it is commonly called, the "Soft Prickly Shield Fern," which, from a botanical point of view, should be considered as only a form of the Prickly Shield Fern, has produced numberless varieties, all of which also help to represent with great advantage the genus *Aspidium* in these Islands.

The common Prickly Shield Fern is one of the oldest known British kinds, for mention of it is made by Johnson in his edition of Gerard's "Herbal," in which not only the name of the discoverer of this Fern, but even the very day of its discovery, is given. There it is described as "*Filix mas* non ramosap innulis latis, auriculatis, spinosis" (Male Fern, not branched, with broad ears and prickly leaflets). To the above description Johnson adds: "This I take to be *Filix mas aculeata major Bauhini* (Bauhin's larger Prickly Male Fern), neither have I seen any figure resembling this plant: it groweth abundantly on the shadowy, moist rocks by Maple Durham, near Petersfield, in Hampshire. John Goodyer, July 4th, 1633."

There is very little doubt that the Soft Prickly Shield Fern, which, though evidently only a form of the preceding one, is by the cultivator considered sufficiently distinct to rank as a species, was known to Ray in 1696, when he published the second edition of his "Synopsis Stirpium Britannicarum." After particularising the Fern previously described as *A.* (*P.*) *aculeatum*, Ray next mentions "*Filix Lonchitidi affinis*" (Fern related to *Lonchitis*), adding: "Under this title was sent to me, by Mr. Lloyd, a plant like to the preceding, but with rounder leafits, and covered all over with longer scales. He collected it in the mountain parts of Wales."

The popular Holly Fern, *Aspidium* (*P.*) *Lonchitis*, is another Fern which for generations past has been known as a representative of the genus *Aspidium* in England. We find that it was unknown as a British plant when, in 1670, Ray published his "Catalogus Plantarum Angliæ," or when his "Historia Plantarum" was issued from the press, in 1686; but it had been discovered by Mr. Lloyd between the latter year and 1696, when Ray mentions it in the second edition of his "Synopsis Stirpium Britannicarum." He then adopted the name of *Lonchitis aspera major* (larger, rough Spleenwort, with indented leaves). He says: "It issues from clefts in the rocks on the tops of the mountains of Wales, as at Clogwyn-y-Garnedh-y-Grib-Goch-Trigvylchan (D. Lhwyd)." The foregoing quotations abundantly prove the acknowledged existence, some two centuries ago, of representatives of the genus *Aspidium* in the British Isles.

Culture.

Very few, if any, of the Ferns belonging to this extensive genus are fastidious in their habits. The exotic species found in the group *Polystichum* are of particularly robust constitution; and whether adapted to stove or to greenhouse treatment, all thrive in a mixture of three parts sandy peat and one part fibrous loam. They also succeed admirably in places where light is not abundant, and where few other Ferns would hold their own.

The British portion of the *Polystichum* group is represented by the Prickly Shield Fern and its numerous varieties, all of which are free-growing, easily-managed, and very desirable Ferns either for the outdoor rockery, for the indoor Fernery, or for pot culture, as all are evergreen, delighting in a mixture of sandy loam and fibrous peat in equal parts, resting on a sound drainage. Although, when once established, the influence of strong light is not injurious to them, they produce much finer foliage when placed in a shady situation during the growing season. They require to be freely supplied with water at the roots: they must also be kept constantly moist during the winter. British Aspidiums are also excellent Ferns for pot culture, as they bear indoor treatment much better than most native Ferns. Their propagation, except in cases of rare varieties, which are only increased by division of the crowns, is usually effected by means of spores, which are produced in great abundance, and which, if sown as they ripen, at the end of the summer, germinate rapidly, and make, during the following summer, young plants which are very valuable for the decoration of the greenhouse and of the conservatory during the ensuing winters.

The deservedly popular Ferns commonly known under the name of *Cyrtomium* are amongst the most useful known decorative plants, on account of their rapid growth and their firm, leathery texture, besides being all very distinct and particularly handsome. They are indeed the best Ferns to use in the least favoured places—in rooms and on staircases, where their leathery foliage seems to defy the deadly influences of draughts, smoke, and even gas, better than any other Ferns with which we are acquainted. Their bold and shining foliage forms a striking contrast to that of finer-cut species when planted out in the cool Fernery, under which treatment they develop into handsome specimens in an incredibly short time, and show themselves to great advantage. For that special purpose Aspidiums of the *Cyrtomium* group are of the greatest value, as by the use of them we are enabled to give additional charm to the rockery not heated artificially, but simply protected by glass, where they, being of an evergreen nature, retain their beauty during the whole of the winter months. Their culture is very simple, and their requirements are particularly limited. The soil which suits them best is a compost of about equal parts of fibrous loam, peat, and silver sand; but care must be taken that they are not potted hard, or, if planted out in the Fernery, that the soil round them is kept moderately loose. They require an abundant supply of water at the roots during the growing season, and frequent syringings overhead are beneficial during that time, but they should be watered sparingly during the winter months. The propagation of plants of this section, like that of most other Aspidiums, is best effected by means of spores, which are abundantly produced, and which germinate very freely if sown as soon as gathered.

Principal Species and Varieties.

A. (Cyrtomium) abbreviatum—Cyr-tom′-ĭ-um; ab-brev-ĭ-a′-tum (shortened), *Schrader*.

A stove species, native of the West Indies, with fronds simply pinnate (once divided to the midrib), 1ft. to 2ft. long and 6in. to 9in. broad, borne on stipes (stalks) 1ft. or more long, smooth and glossy. The pinnæ (leaflets), of a sub-coriaceous (nearly leathery) texture and slightly stalked, are 4in. to 6in. long, ¾in. broad, narrow-spear-shaped, tapering to a sharp point, and with their edge bluntly lobed. The sori (spore masses) are disposed in two irregular rows situated between the principal veins.—*Hooker, Species Filicum*, iv., p. 38, t. 234.

A. acrocladon—ac-roc′-lad-on (summit-branched). A name applied to varieties of *A. aculeatum* and *A. angulare*.

A. (Polystichum) acrostichoides—Pol-ys′-tich-um ; ac-ros′-tich-ŏ-i′-des (Acrostichum-like), *Swartz.*

This hardy, exotic Fern, very dissimilar from all other known species, is a native of North America, where it is found on the hillsides, most generally in rocky places, from New Brunswick and Canada westward to Wisconsin, and southward to Arkansas and Central Alabama. According to Eaton, this handsome species has not been found wild anywhere except in North America, where it is one of the most abundant Ferns known. The popular name of "Christmas Fern," under which it is known all through the United States, originates from the extensive use of its fine, glossy fronds for the decoration of houses and churches at Christmas-time. From the end of the rootstock or rhizome, which creeps just beneath the surface of the soil for a distance of several inches, the fronds, which usually make their appearance in early spring and remain fresh and green until the new growth appears the next season, rise in a graceful crown. They are borne on stipes (stalks) 6in. to 8in. long and nearly terete (cylindrical), being slightly flattened on the anterior or upper side, of a bright green colour on their upper part, becoming brownish towards the base ; these stalks are also densely covered with large and small intermixed scales, of an equally light brown colour. The leafy portion of the fronds, when fully developed, is 1ft. to 2ft. long, and rarely as much as 5in. broad ; they are furnished

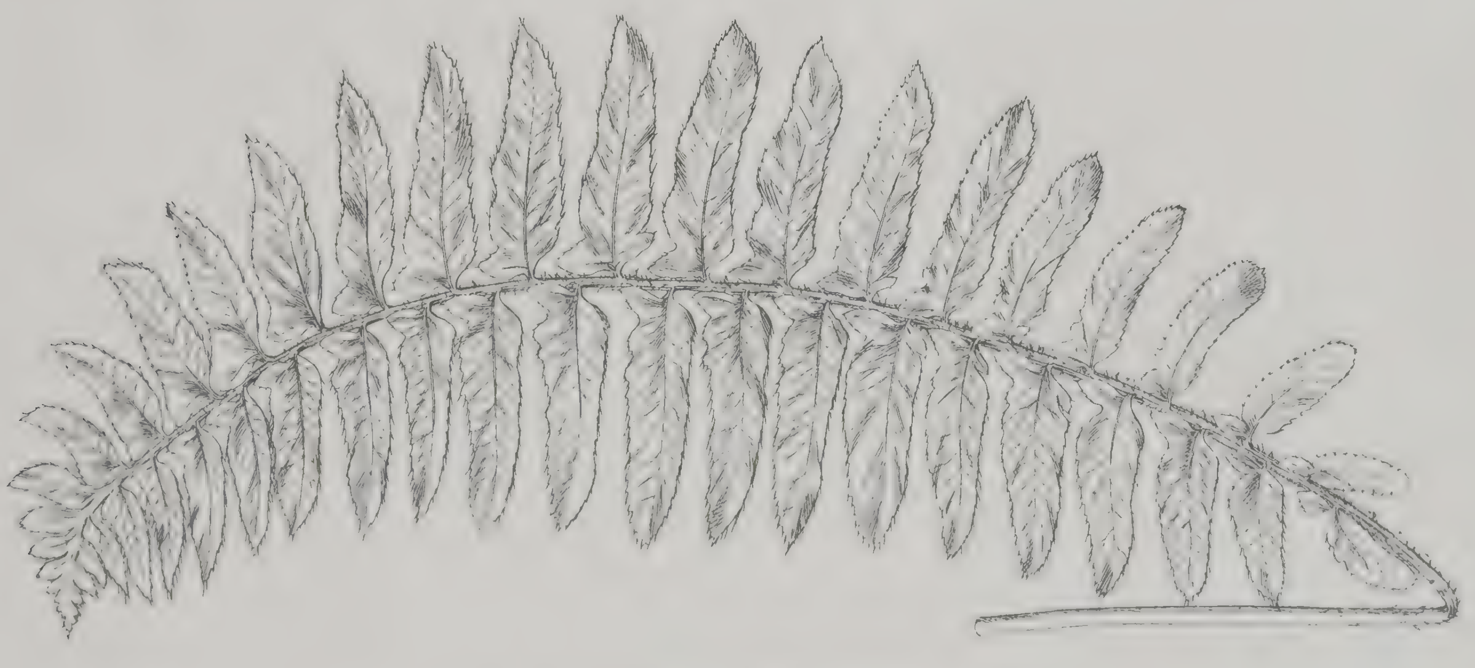


Fig. 57. Frond of Aspidium acrostichoides
(⅓ nat. size).

on each side of the midrib with from twenty-four to thirty pinnæ (leaflets), the uppermost of which become gradually smaller (Fig. 57), the frond ending in a short, serrated point. The largest of the barren pinnæ are 2in. to 3in. long, ½in. broad in the middle, oblong or oblong-spear-shaped from a very unequal base, being suddenly narrowed to a short stalk on the lower side of the base, but furnished on their upper side with a well-developed, triangular, bristle-tipped ear; their margin is finely serrulate (dented) with incurved, bristle-tipped teeth. They are of a sub-coriaceous (almost leathery) texture, of a deep green colour, very smooth and shining on their upper surface, while their under-part is somewhat paler and minutely chaffy. In the fertile fronds, which are usually taller, or at least more erect, than the sterile ones, the upper third part is suddenly contracted, so that the lowest fertile leaflet is not more than two-thirds as long or as broad as the barren one next below it. The sori (spore masses), which are covered by an indusium of orbicular form and attached at the centre, occupy the whole under-side of the fertile pinnæ.—*Hooker*, *Species Filicum*, iv., p. 9. *Nicholson*, *Dictionary of Gardening*, i., p. 125. *Eaton*, *Ferns of North America*, i., t. 34. *Lowe*, *Ferns British and Exotic*, vi., t. 19.

Though perfectly hardy in most parts of this country, this highly decorative Fern proves most useful when grown all the year round in either the cold house or the conservatory, where its handsome fronds last much longer than outside: these, being of good substance, are very useful for cutting, and are admirably adapted for mixing with flowers. It is a species which thrives best in sandy peat and leaf-mould, with an abundance of water at the roots all the year round.

A. acrostichoides has produced several distinct varieties, such as:

A. a. grandiceps—gran′-dic-eps (large-crested), *Moore.*

This very handsome variety, of garden origin, is the only crested North American Fern with which we are at present acquainted. It is smaller and altogether more compact in habit than the type, from which it also differs by the large crests formed at the end of the fronds, and the crests of smaller dimensions with which their pinnæ (leaflets) are also ornamented. Like the species, it is equally desirable for the hardy Fernery or for the conservatory.—*Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. a. incisum—in-ci′-sum (incised), *Gray.*

A pretty form, having broader fronds than the type; the leaflets also are wider, deeply cut, and sharply pointed. Eaton, who mentions it in his work on the "Ferns of North America," vol. i., p. 258, says that "the pinnæ (leaflets) are incisely toothed, those of the fertile fronds bearing sori (spore masses) at the tips, clear to the base of the fronds."—*Nicholson, Dictionary of Gardening*, i., p. 126.

A. a. Schweinitzii—Schwein-itz′-ĭ-i (Schweinitz's), *Beck.*

A form found in North Virginia; it differs from the typical species only in the shape of its pinnæ (leaflets), which are lobed (eared) at the base. — *Eaton, Ferns of North America*, i., p. 258. *Hooker, Synopsis Filicum*, p. 250.

A. (**Polystichum**) **aculeatum**—Pol-ys′-tich-um; ac-u-lĕ-a′-tum (Prickly Shield Fern), *Swartz.*

This very interesting and highly decorative, hardy species, of handsome growth, and whose brilliant, shining fronds are of quite an evergreen nature, is a Fern of the most cosmopolitan character known, for it is recognised as a native of North America and India alike, also of all parts of Europe, where it is found in situations varying from the sea-level to an altitude of above 3000ft. Mr. E. J. Lowe, who has made Ferns a special study, states, in his excellent work, "Our Native Ferns," vol. i., p. 197, that "it is a native of Scandinavia, Switzerland, Germany, Holland, France, Belgium, Spain, Portugal, Italy, Greece, Turkey, Austria, Russia, Africa, Madeira, and the United States of America." As an illustration of the wide distribution of this Fern in Europe, he also adds: "In 1860, whilst travelling amongst the Spanish mountains, along the spurs of the Pyrenees, I found *Polystichum aculeatum* repeatedly. On the Villia Escusa, a mountain a few miles south of Reinoso, this Fern was growing luxuriantly amidst the street-like rocks, so much so as to be a shelter to the numerous wolves and foxes that inhabit this mountain. Whilst the Asphodel, Rock Rose, Iris, Linum, and many other splendid alpine plants were richly strewn over the open land, this Fern occupied every available space where there was shelter and moisture. It was seen peeping out of the Horodada, in the Congosto Pass, amongst the trees in the Hoz de Barcena, on the Pena Castilla at Fuento del Mar, and where lashed by the waves of the Bay of Biscay at Santander. In the Highlands of Scotland it ascends upwards of 2000ft. above the sea, and in Northern Spain I have seen it most common above the height of 3000ft."

According to Beddome, *A. aculeatum*, as an Indian Fern, "is very common about Otocamund and the higher elevations of the Pulney and Anamallay Mountains." The same authority, in his splendid book on the "Ferns of Southern India," in which he gives two illustrations, also makes the following statement: "It is a very variable species, with numerous forms which have received different names, but they all run into one another. *Polystichum rufo-barbatum*, Wallich, is a very beautiful form, common about Otocamund: it is densely clothed with reddish hairs. *Polystichum angulare*, which has been united with *P. aculeatum* by Sir W. Hooker, is a very common form at Otocamund, &c."

Eaton, speaking of *A. aculeatum* as a native of North America, says: "It is found in deep, rocky ravines in mountainous districts in North America, where several very distinct forms occur in wild state, some of which, strange to say, are also found in natural state in England. For instance, the varieties *lobatum* and *angulare*, found in various parts of the British Isles, have equally been found in the cañons of the coast ranges of California, especially in Santa Cruz and Mendocino Counties, which have also produced the variety *californicum*, of Eaton. The variety *Braunii*, of Doell, has been found amongst the mountains of North Vermont and New Hampshire, on the Catskill Mountains of New York, in Oswego County, &c."

It is as a British species, however, that *A. aculeatum* is best known, and the fact of its being widely distributed all over the country, where it is generally found to luxuriate on damp, shady banks, along hedgerows, or in woods, and usually in somewhat stiff, loamy soil, greatly adds to its value as a decorative plant for the outdoor Fernery. As an instance of the exceptionally wide distribution of the Prickly Shield Fern, it may be stated here that, while it formerly was plentiful in Osterley Park, Hampton Lane, and Sion Lane, near Brentford; near Hastings and other places in Sussex, as well as about Tunbridge Wells and near Gurnet Bay, in the Isle of Wight, it is to this day frequently met with near Halifax, and in the neighbourhood of Richmond, in Yorkshire; in Leigh, St. Anne's, and Stapleton Woods, near Bristol; in the Isle of Man; near Bromsgrove, in Worcestershire; in Warwickshire; in Shapscombe Wood, near Painswick, in Gloucestershire; in Burton Wood, near Warrington, in Lancashire; in Charmwood Forest; at Kingsteignton, in Devon, and in many other places in England. It is also found in quantities in Wales, near Bangor and Carnarvon; at Cicle, near Beaumaris, and at Lleiniog Castle, Anglesey; and near Wrexham, in Denbighshire. In Ireland the common Prickly Shield Fern is found near Clonmel, at Colin Glen, Belfast, and at Hedge Bank, near Carrickfergus; while in Scotland, where it is still abundant, one meets with it about Drumlanrig, in Nithsdale, at Peasebridge, and on Cartland Rocks, near Lanark.

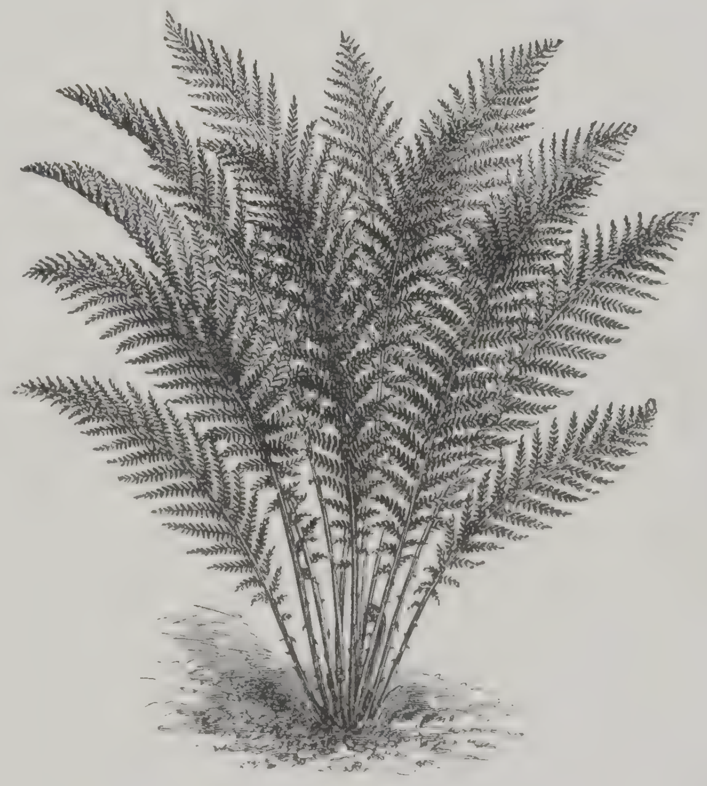


Fig. 58. Aspidium aculeatum (much reduced).

A. aculeatum is a particularly strong, bold-growing Fern (Fig. 58), with numerous ovate-lanceolate (egg-spear-shaped) fronds, attaining a height of 2½ft. to 3ft., including the stipes (stalks), which vary from 6in. to 10in. in length. They are 8in. to 10in. broad at their widest part, produced from a stout, tufted caudex (stem), and disposed in such a way as to give the plant the appearance of a gigantic shuttlecock. The fronds, of a coriaceous (leathery) texture, are of a shining dark green colour on their upper side, while their under-side is of a paler tint; the stalks, as well as the crown of the plant, are densely covered with large, blackish-brown scales. The inferior pinnæ (lower leaflets), 4in. to 6in. long and ½in. to ¾in. broad, are closely set, and their unequal-sided pinnules (leafits) are auricled (eared) on the upper side at the base. The rachis (stalk of the leafy portion) is straw-coloured, and more or less covered with scales similar in colour to those clothing the crown and stalks. The fructification of this truly handsome species presents a peculiarity of special note, inasmuch as, instead of the frond being fertile throughout, the spores are almost exclusively confined to the upper portion, where the sori (spore masses) are disposed in parallel lines, situated nearer the midrib than the edge, and form, so to speak, two rows of circles gradually diminishing in size from the base of the pinnæ to their point on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 18. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Lowe*, *Our Native Ferns*, i., t. 20. *Eaton*, *Ferns of North America*, ii., t. 62. *Beddome*, *Ferns of Southern India*, t. 121.

A. aculeatum has produced comparatively few striking varieties, although in a list published in March, 1865, by Mr. P. Neill Fraser, of Canonmills Lodge, Edinburgh, we find that no less than twenty-three of them are enumerated. But this was at a time when British Ferns were at the height of their popularity, and it is doubtful if half that quantity have survived, and could now be found in collections.

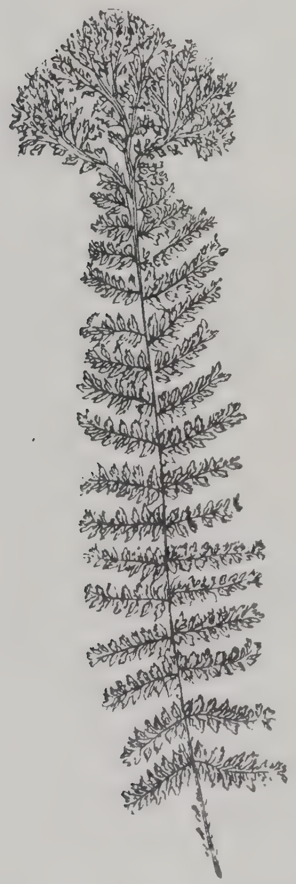
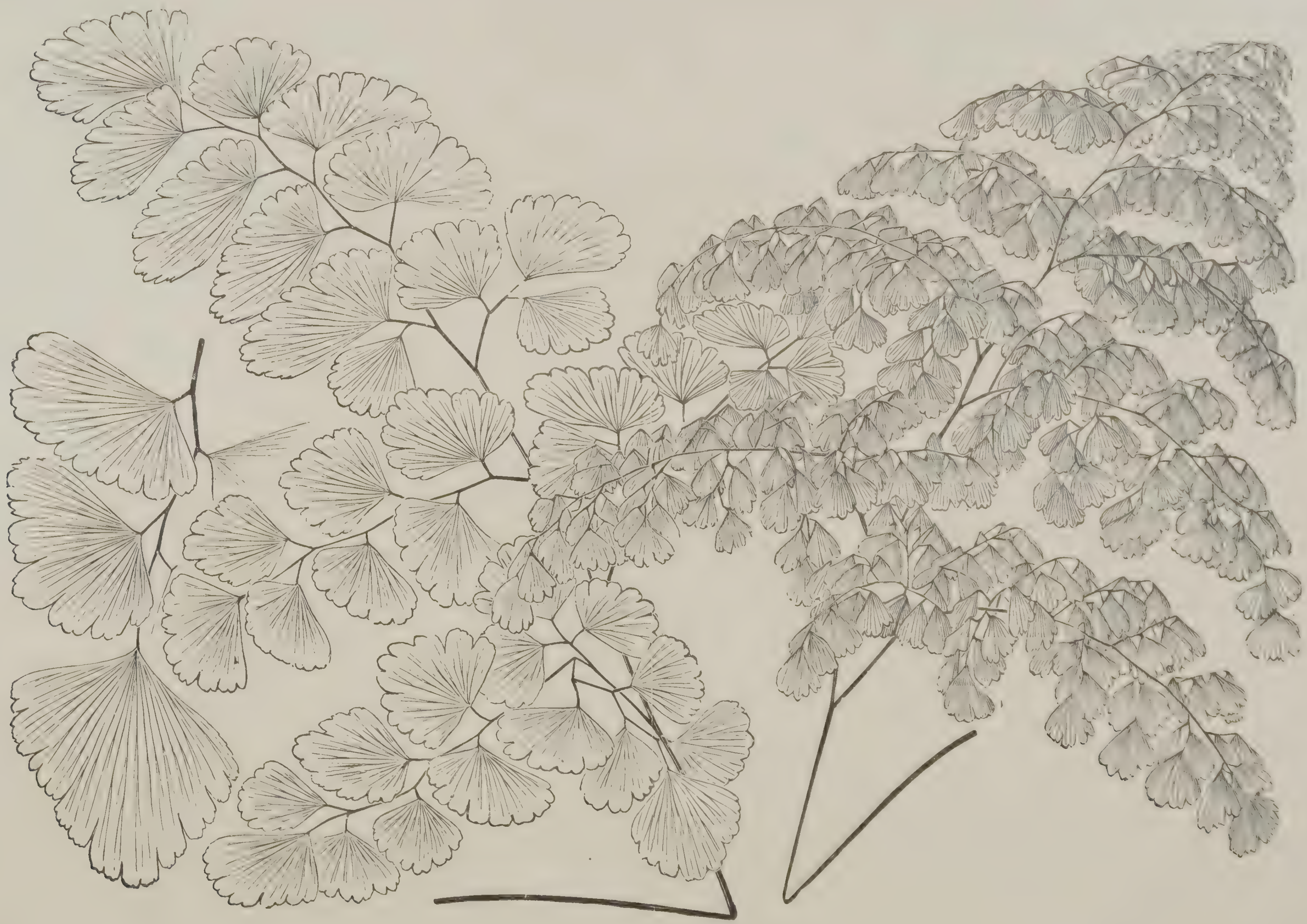


Fig. 59. Frond of Aspidium aculeatum acrocladon (much reduced).

A. a. acrocladon — ac-roc′-lad-on (branched at the summit), *Lowe*.

This remarkably handsome form, which was originally found in the neighbourhood of Exeter, is undoubtedly the most exquisite of the several crested, forked, or branched forms of *A. aculeatum* known. The greater portion of the fronds, which attain 1½ft. in length and are of a rich green colour, is narrow. They are furnished with pinnæ (leaflets) which, on their lower portion, are again divided to the midrib, while the upper portion is dilated and slightly crested. The summit of the fronds is three-branched: the branches again forking, and their branches forking again, form a head of dense, multifid (many-cleft) segments (Fig. 59) sometimes three times the width of the lower portion of the frond. In general appearance, this



Portions of Fronds of Adiantum rhodophyllum and Entire Frond of Adiantum cuneatum deflexum

(⅓ nat. size).

splendid form may be said to correspond with the better-known variety *grandiceps* in the section of *A. angulare.—Lowe, Our Native Ferns,* i., p. 201, fig. 159.

A. a. argutum—ar-gu′-tum (sharply-notched), *Moore.*

A variety with broad, spear-shaped fronds, differing from the normal form through its pinnules (leafits) being narrowed and elongated, and terminating in an acute spine, as also in having long spines to the marginal teeth and a conspicuous auricle (ear) at the base of each pinnule. It has been found wild in Buckinghamshire and in South Devonshire.—*Lowe, Our Native Ferns,* i., p. 204, fig. 163.

A. a. crassum—cras′-sum (thick), *Moore.*

This variety, found in the neighbourhood of Basingstoke, is distinguished from all others by its short, broad, overlapping pinnules (leafits), which are biserrate (the serratures or teeth themselves serrated or dented again) and of a particularly thick texture.—*Lowe, Our Native Ferns,* i., p. 199.

A. a. cristato-gracile—cris-ta′-to-grac′-il-ĕ (slender-crested), *Moore.*

A very elegant and beautiful variety, of slenderer habit than the type, and finely crested. It was found wild in the neighbourhood of Exeter.

A. a. cristatum—cris-ta′-tum (crested), *Moore.*

In this pretty variety, found at Barnstaple, the pinnæ (leaflets) are pinnate (divided to the midrib) on their lower half, but only pinnatifid (divided half-way to the midrib) in their apical (upper) portion. Their oblong, acute lobes become more confluent as they advance towards the extremity of the frond, which is somewhat widened and crispy. The pinnules (leafits), oblong in form and sharp-pointed, have their base cuneate (wedge-shaped), with a small anterior auricle (ear).—*Lowe, Our Native Ferns,* i., p. 203.

A. a. densum—den′-sum (dense), *Moore.*

This very handsome, bold, and distinct variety, originally found wild in Devonshire, is remarkable through its lanceolate (spear-shaped) fronds, 10in. to 15in. long and 3in. to 5in. broad, being furnished with ample and somewhat crowded pinnules (leafits), which, by their disposition, give the plant an imbricated (overlapping) appearance.

A. a. furcatum—fur-ca′-tum (forked), *Lowe.*

This variety, which was found wild in Devonshire, is of robust habit, and differs from the typical species through its fronds, 2½ft. long, being invariably forked at their extremity.—*Lowe*, *Our Native Ferns*, i., p. 202, fig. 160.

A. a. interruptum—in-ter-rup′-tum (interrupted), *Lowe.*

In this extremely curious variety, found wild in North Devonshire, the fronds, 2ft. long by about 5in. broad in their widest part, have a particularly depauperated (impoverished) appearance. The pinnæ (leaflets) are alternate (not opposite), and normal at the base, where there are four or five pairs of fully-developed pinnules (leafits); then there are about half-a-dozen pairs of pinnules reduced to mere lines, or footstalks, above which the extremity of the pinnæ again becomes normal.—*Lowe*, *Our Native Ferns*, i., p. 203, fig. 161.

A. a. lobatum—lob-a′-tum (lobed), *Deakin.*

This variety, which is undoubtedly the most striking of all those at present in cultivation, is exactly intermediate in size between *A. aculeatum* and *A. Lonchitis*, its fronds being from 1ft. to 1½ft. long. In his "Synopsis Stirpium Britannicarum," Ray, who gives it as a distinct species, describes it as "*Filix aculeata major* pinnulis auriculatis crebioribus, foliis integris angustioribus" (larger Prickly Fern with closer and eared pinnæ, and with the whole frond narrower). Sir J. E. Smith, who acknowledges that Ray has well marked the differences between *A. aculeatum* and *A. lobatum*, also rightly observes that the latter is always distinguished by its much shorter, more crowded, and less scaly pinnæ (leaflets). Its pinnules (leafits) are also more nearly entire, being but slightly auriculate (eared), very convex, thick, and of a glaucous (bluish-green) colour. Like the typical species, *A. a. lobatum*, which is even hardier than either *A. aculeatum* or *A. angulare*, is generally found growing wild on shady hedge-banks in nearly all parts of the United

Kingdom. In his "Analysis of British Ferns," Mr. Francis states that "it is extremely common in Scotland and in the North of England, gradually losing itself towards the South and becoming more and more intermingled with *Aspidium* (*Polystichum*) *aculeatum*, which, in its turn, is superseded still more southerly by *Aspidium* (*Polystichum*) *angulare.* In the middle and South of England its recorded habitats are Leicestershire; Pottery Car, near Doncaster; Matlock, Derbyshire; Studley, Lambourne, Overley, and Weatherly, in Warwickshire; a lane leading to the Vache from Chalfont, Bucks; near Bristol; near Dorking, Surrey; in Hants, &c.; near Yarmouth; in Sussex and Kent; in Wales, near Wrexham, Denbighshire; and in Ireland, at Colin Glen, near Belfast; Hermitage, County Wicklow; County of Derry; Glen Fee, Clova Mountains; as also in Braid Woods, near Edinburgh." The sori (spore masses) are more confined to the upper part of the frond, and larger than in *A. aculeatum.* —*Lowe, Our Native Ferns*, i., p. 198, fig. 157.

A. a. l. acutum—ac-u′-tum (sharp-pointed), *Jervis.*

This form, found wild in Staffordshire and in Somersetshire, differs from the foregoing plant principally through having the extremity of its attenuated fronds narrowed out into a long point; their pinnæ (leaflets), nearly tapering to a point, have their sub-divisions crowded, small, and very spiny-toothed. —*Lowe, Our Native Ferns*, i., p. 199.

A. a. multifidum—mul-tif′-id-um (much-cleft), *Wollaston.*

A very pretty and distinct variety, with fronds of dimensions equal to those of the typical form, from which it essentially differs through their extremity being divided into a spreading tuft of numerous deeply-laciniated branches. It was found wild in Suffolk and also in Somersetshire.—*Lowe, Our Native Ferns*, i., p. 199.

A. a. plumosum—plu-mo′-sum (feathery), *Lowe.*

This feathery-looking variety, which was found wild near Marwood, is of normal size and outline, but it differs from the typical form in the close and elegant character of its long, feathery fronds.—*Lowe, Our Native Ferns*, i., p. 206, fig. 165.

A. a. proliferum—pro-lif′-er-um (plant-bearing), *Wollaston.*

This is a very elegant variety, and, like the better-known *A. angulare proliferum*, has finely-divided fronds, which are somewhat sparingly proliferous.

A. a. pulcherrimum—pul-cher′-rim-um (very beautiful).

This is described by Druery as a remarkably handsome and extremely rare, uncrested form (Fig. 60), quite barren, and with the pinnules (leafits) elongated and curved sickle-fashion, imparting a peculiar beauty to the frond.

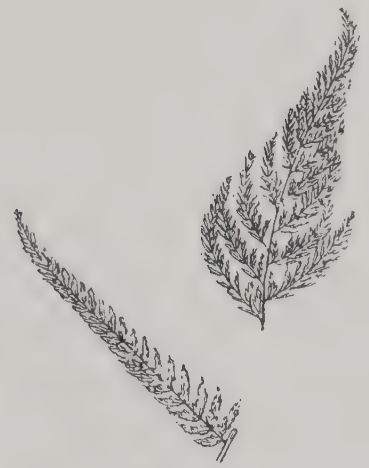


Fig. 60. Pinna and Tip of Frond of Aspidium aculeatum pulcherrimum
(much reduced).

A. a. pulchrum — pul′-chrum (fair), *Lowe.*

The fronds of this very handsome variety, which was found wild in North Devonshire, and which under cultivation has proved perfectly constant, are of normal dimensions and furnished with pinnæ (leaflets) with somewhat narrow and deeply-cleft pinnules (leafits). Each of the pinnæ is slightly yet distinctly forked, and the frond itself terminates in a spreading head of elegantly-laciniated and repeatedly-forked divisions.—*Lowe*, *Our Native Ferns*, i., p. 204, fig. 164.

Several distinct Ferns, from various and distant habitats, commercially considered and accepted amongst amateurs as so many species, are merely forms more or less closely related to *A. aculeatum.* With the exception, however, of *A. angulare*, which for reasons already stated (p. 412), and though botanically a form of the common Prickly Shield Fern, is treated separately here, none possess sufficiently distinctive characters to retain the rank of species. The question is of so serious a nature that we consider it necessary to reproduce here in full the following note, which is extracted from the "Synopsis Filicum," and which bears exclusively on this most important subject :

"*A. squarrosum*, Don (*rufo-barbatum*, Wallich), has the rachis densely clothed with reddish-brown, fibrillose scales ; *A. proliferum*, Brown, is a proliferous Australian form; *A. restitum*, Swartz, has the rachis densely clothed to the point both with reddish-brown fibrillose and large lanceolate dark brown scales; *A. biaristatum*, Blume, has the frond narrowed suddenly upwards, and large rhomboidal pinnules, aristate principally at the point and auricle; the Cape *A. luctuosum*, Kunze, has the scales of the rachis fibrillose and nearly black; *A. Tsus-Simense*, Hooker, is probably a slender form; and *A. ordinatum* and *Moritzianum*, Kunze, and *Polypodium muricatum*, Linnæus, are luxuriant forms from South America. We have non-indusiate forms from New Zealand (*Polypodium sylvaticum*, Colenso), Britain (var. *plumosum*, Moore); and there is a wide range of forms in South America included under *Polypodium rigidum* (Hooker, 'Species Filicum,' iv., p. 246) which correspond to the various forms of this species, differing only by the want of an involucre."

All the above-named Ferns, and many others besides, are usually treated as species by nurserymen and amateurs, whereas they are but variations of *A. aculeatum*.

A. acutum—ac-u′-tum (sharp-pointed). A variety of *A. angulare*.

A. alatum—al-a′-tum (winged). A variety of *A. angulare*.

A. (Polystichum) amabile—Pol-ys′-tich-um; am-a′-bil-ĕ (lovely), *Blume*.

This remarkably pretty species, which thrives equally well in the intermediate or in the warm house, is a native of Nepaul, Ceylon, the Malaccas, Formosa, and Japan. It is of medium growth, for its lanceolate (spear-shaped) fronds, 1ft. or more long and 6in. to 9in. broad, are borne on slender, polished stipes (stalks) slightly scaly below. The rachis (leafy portion) is composed of a long terminal pinna (leaflet) and from six to nine lateral ones, disposed on each side of the midrib; these are of a sub-coriaceous (almost leathery) texture, of a pleasing soft green colour, 6in. to 8in. long and 1in. to 1½in. broad; sometimes the lowest are slightly compound at the base. The sub-divisions of the pinnæ, ½in. to ¾in. long, are of a peculiar shape, having at least half their lower side cut away, the upper side and the outer part of the lower one being lobed and sharply serrated (toothed like a saw). The sori (spore masses) are sub-marginal (disposed close to the margin of the fertile leaflets).—*Hooker, Species Filicum*, iv., p. 25, t. 225.

A. (Polystichum) angulare—Pol-ys′-tich-um; ang-ul-a′-rĕ (angular), *Presl.*

This very handsome Fern, popularly known as the Soft Prickly Shield Fern, which botanically is but a form of *A. aculeatum*, but which to the cultivator is abundantly distinct, is, like that species, of an evergreen nature, its elegant foliage remaining green and in perfect condition until long after the new growth is developed. In habit, however, it is more pendulous, and its fronds, which frequently attain 3ft. in length and 6in. to 9in. in width, are usually lax, lanceolate (spear-shaped), and bipinnate (twice divided to the midrib): they are produced from a stout, tufted caudex (short stem), are numerous, spreading, and arched, and, like the stalks and the crown itself, are covered with reddish-brown, chaffy scales. The pinnæ (leaflets) are abundant, and greatly vary in length: sometimes the basal ones are longest, but usually they taper towards the base and also towards the summit. The pinnules (leafits), of a dark green colour, are also of smaller dimensions, more equal in size, and the lower ones are distinctly stalked; they are usually deeply divided, each segment thus produced ending in a slender but rigid bristle; they are also of a softer and more delicate texture than those of *A. aculeatum:* consequently, being more flexible and drooping, they give the whole plant a more graceful general appearance. The fructification is usually spread over the upper two-thirds of the under-side of the fronds, and consists of sori (spore masses) of circular shape and of diminutive dimensions, covered by an indusium that is nearly round and of a soft, paper-like texture, and disposed in two rows on each side of the midvein of each fertile pinnule.

Like *A. aculeatum*, the Soft Prickly Shield Fern is very widely distributed, for it is found in Sweden, Norway, France, Spain, and Italy alike in Europe; in various parts of India, Abyssinia, and Natal; also in Madeira, the Canary Islands, and the Azores; while in North America it is plentiful, and it is even found in abundance in Mexico, Guatemala, Caracas, Java, New Granada, and Singapore.

Considered only as a British species, this lovely and most interesting Fern has an extended, though somewhat local, range over England and Wales, being most plentiful in the South and South-West. It is common in Cornwall and Devonshire, also in Hampshire, Surrey, Sussex, and Kent.

while at Chaigeley, in Lancashire, it is, or formerly was, very abundant. Although it is found wild on the Pyrenees, at elevations varying between 2000ft. and 3000ft., in England, as well as in Ireland, where it is frequently met with, this plant prefers lowland shady woods or hedge-banks where the soil is naturally and constantly moist. Indeed, it may be said to affect exactly the same situations as *A. aculeatum*. Its presence in Scotland is only recorded from Argyleshire and Berwickshire.

With regard to variation, this species differs essentially from *A. aculeatum*, which is, or appears to be, singularly constant in its character when compared with the Soft Prickly Shield Fern, remarkable varieties of which have been either found wild or raised artificially from spores in such quantities that the forms affected by the fronds are very extensive, and many of them are remarkably handsome and decorative. Thus we have forms of much larger size than the species from which they spring, and others very dwarf; some with very broad fronds, as we also have particularly narrow-fronded varieties. Among them we notice some with almost entire pinnæ and pinnules (undivided leaflets and leafits) and others in which these organs are extensively and deeply divided. In some varieties, again, the pinnules are large and more or less circular, while in others they are so small as to be almost linear. The variability in cristation is also particularly noticeable in *A. angulare*, and this singular character is well illustrated by varieties whose fronds are branching from the base, by others which are crested at their apex or summit, while the tips of the fronds and also of the pinnæ of numerous varieties are multifid or crested; some are even proliferous (furnished with young plants) on the greater part of their midrib, thus showing a distinct departure from the typical species to which they owe their origin.

These varieties are now so numerous that, although many others not found in the following list may possibly be considered of equal decorative value, we feel bound to limit ourselves to the descriptions of the most distinct forms only.

A. a. acrocladon—ac-roc′-lad-on (summit-branched), *Moore*.

This splendid form, native of Devonshire, is of comparatively dwarf habit and one of the most striking of all known varieties. Its fronds, about 10in. long, are repeatedly branched at their extremity (Fig. 61); the pinnæ (leaflets) of their lower part are opposite, but those of the upper portion are alternate (not opposite). The rachis (stalk of the leafy portion) is densely clothed with scales of a very light brown colour; these are disposed even on the under-side of the pinnules (leafits), and extend beyond the edges, giving them the appearance of being fringed with spines, especially in the upper half of the fronds.—*Lowe*, *Our Native Ferns*, i., p. 129, fig. 105.

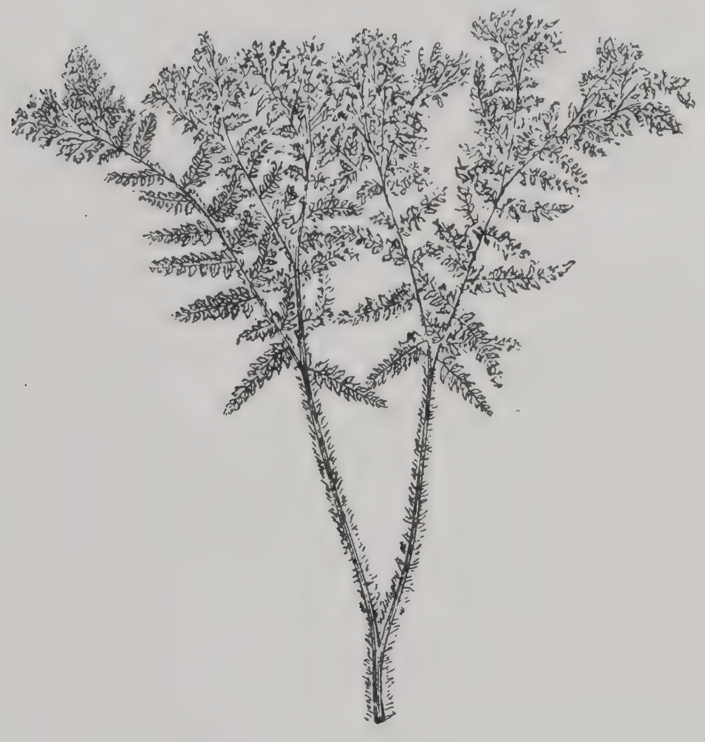


Fig. 61. Frond of Aspidium angulare acrocladon (¼ nat. size).

A. a. acutilobum—ac-u-til′-ob-um (with acute lobes), *Wollaston.*

A very pretty and distinct variety, originally found near Barnstaple. Its fronds, 2ft. to 2½ft. long and about 6in. broad, have lanceolate pinnæ (spear-shaped leaflets) about ½in. wide and of nearly even breadth to near the tapering point. These are furnished with acute-lobate pinnules (lobed and sharp-pointed leafits), those on the lower side being longer and more developed than those on the upper side of the pinnæ; they are slender-stalked and very spiny, the spines curling round in all directions.—*Lowe*, *Our Native Ferns*, i., p. 126, fig. 102.

A. a. acutum—ac-u′-tum (sharp-pointed), *Wollaston.*

This interesting and distinct variety was found in a wild state in Devonshire, in Hampshire, and in Sussex. It is of robust habit and rather large, somewhat resembling *A. aculeatum* in general appearance. Its fronds, 2ft. to 2½ft. long, are spreading and borne on comparatively long stipes (stalks) which are thickly covered with large scales of a dark brown colour. Their pinnæ (leaflets), about ½in. wide, are somewhat tapering and distant (not closely set, as is usually the case), and furnished with pinnules (leafits) borne on distinct though short footstalks; these pinnules are conspicuously auricled (eared) and sharply dented all round, ending in a very sharp point. —*Lowe*, *Our Native Ferns*, i., p. 77, fig. 45.

A. a. alatum—al-a′-tum (winged), *Moore.*

This extraordinary variety, which was originally found in Somersetshire, and also in Devonshire, is of comparatively small dimensions, for its fronds seldom exceed 1¼ft. long and 6in. wide. These are borne on scaly, short stipes (stalks) ; they are lanceolate (spear-shaped), and their pinnæ (leaflets), deeply cut nearly to the midrib, are furnished with pinnules (leafits) more pointed and tapering than in the normal form, the anterior or lower side being most developed ; their margin is cut into rounded teeth, which terminate in a bristle-like point. This variety is remarkable on account of its pinnules being all joined together by a well-developed wing, or continuous leafy attachment, on either side of the rachides (midribs) of the secondary divisions.—*Lowe*, *Our Native Ferns*, i., p. 119, t. 19b.

A. a. aristatum—ar-is-ta′-tum (awned), *Wollaston and Moore.*

This distinct and pretty variety was found wild in Sussex, also near Burnley, in Lancashire, and later on in Shebden Dale, near Halifax, and near Marwood, in Devonshire. It is of slender habit, and its chief distinction from the typical *A. angulare* consists in the bristly points of the divisions being much more developed than usual, and turning upwards. These long, hair-like points, which greatly resemble the beard of the corn, give the plant a peculiar and bristly appearance. It is also remarkable for the proliferous character of the stalks of its fronds.—*Lowe*, *Our Native Ferns*, i., p. 80, fig. 48.

A. a. Bayliæ—Bayl′-ĭ-æ (Miss Bayly's).

The plant commonly known under this name in the trade is one of the numerous forms of *A. a. grandidens*—*A. a. g. Baileyanum* of Lowe.

A. a. biserratum—bis-er-ra′-tum (twice saw-toothed), *Moore.*

This remarkable form, which is common in Jersey, has also been found in Devonshire, Somersetshire, and other parts of England, as well as near Dublin. It bears a great resemblance to *A. aculeatum.* The large, spreading fronds, which are borne on very long stipes (stalks), measure from 1½ft.

to 2½ft. in length and 6in. in width; they are remarkable for their thick texture as also for the large size of their pinnules (leafits), which are more or less twin spiny-toothed: from this unusual character its varietal name was derived.—*Lowe*, *Our Native Ferns*, i., p. 77, fig. 46.

A. a. brachiatum—brach-ĭ-a′-tum (brachiate, or having successive opposite pairs of branches disposed at right angles to each other), *Moore.*

A remarkable variety, native of Devonshire. Its singular appearance is produced by the lowest pair of pinnæ (leaflets) being sometimes so large as to appear like branches. This curious character gives the fronds, which are 1ft. to 2ft. in length, quite a pyramidal form, being much the broadest at the base; they are also stiff-habited and densely leafy, of a yellowish-green colour above and rusty-coloured beneath. The narrow and sharp-pointed pinnæ vary in length in different portions of the frond, and are usually shorter in the centre than at the base. Their pinnules (leafits), much overlapping at the base, broad and cut into many small, shallow, stiff-spined teeth, are distinctly stalked and lobed; each pinnule next the midrib of the frond is so deeply cut that at that point the frond becomes tripinnate (thrice divided).—*Lowe*, *Our Native Ferns*, i., p. 106, fig. 77.

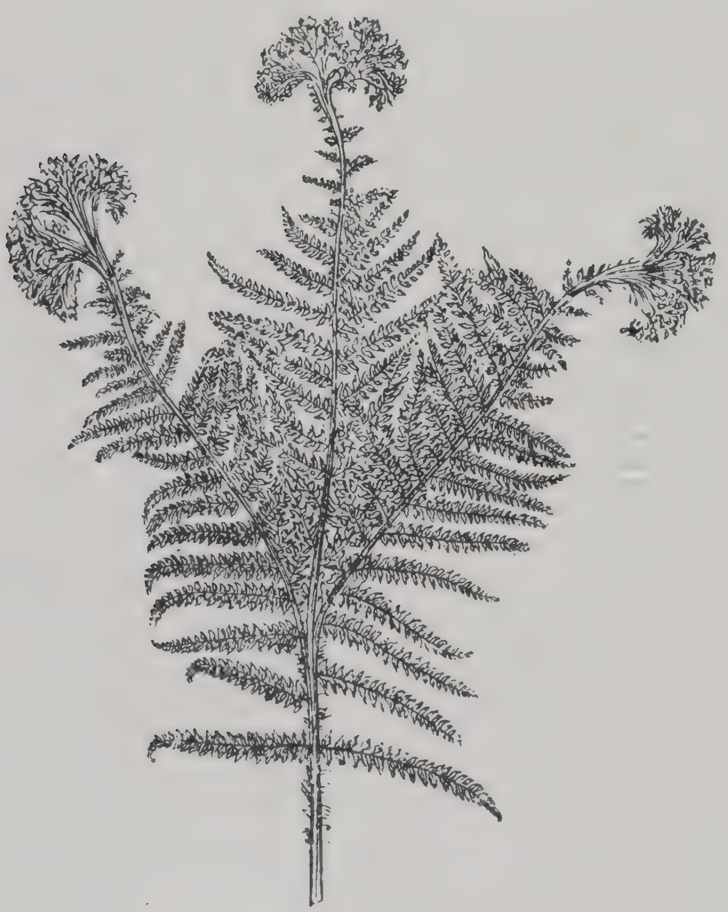


Fig. 62. Frond of Aspidium angulare brachiato-cristatum

(¼ nat. size)

Gray's *A. a. brachiato-cristatum* (Fig. 62) is only a form of *A. a. brachiatum*, in which the ends of each branching part of the fronds terminate in a tuft, giving the plant a most peculiar appearance.

A. a. concinnum—con-cin′-num (neat), *Moore.*

This exceedingly pretty form of a more or less plumose nature, which was originally found near Nettlecombe, is remarkable for the rich green colour and the very graceful habit of its fronds: they are 2ft. long and about 6in. wide in the centre, gradually narrowed to a tapering, slender-spined point, and furnished with pinnæ (leaflets) disposed is an ascending manner. The pinnules (leafits), which are closely set and much cut, though not deeply, have their basal lobe and that immediately above it ending in a spine, or rather in a double spine, so that each pinnule is furnished with from twelve to twenty spines or bristles.—*Lowe, Our Native Ferns*, i., p. 173, fig. 151.

A. a. confluens—con′-flu-ens (joined). A synonym of *A. a. lineare.*

A. a. cornutum—cor-nu′-tum (horned).

This curious form, which in commerce is known under the name of *Polystichum angulare cornutum*, is simply one of the numerous varieties of *A. a. grandidens.*

A. a. cristatum—cris-ta′-tum (crested), *Moore.*

An exceedingly beautiful Fern, represented by several forms which have originally been found near Bristol, in Somersetshire, or in Devonshire, but all of which appear to retain the normal dimensions of the species, from which they differ by their crested character. In general outline it greatly resembles the normal form, but the point of each frond, as also that of each pinna, ends in short, densely-tufted and crispy crests or tassels (Fig. 63), those of the pinnæ being much less developed than the terminal one, the whole forming a tasselled-margined frond, such as is noticed in the much commoner crested forms of the Male and Lady Ferns.—*Lowe, Our Native Ferns*, i., p. 81, t. 16.

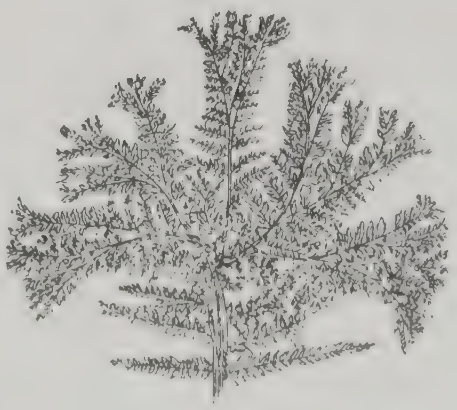


Fig. 63. Crest of Aspidium angulare cristatum (¼ nat. size).

A. a. cruciatum—cruc-ĭ-a′-tum (having pinnæ disposed in the form of a cross). Synonymous with *A. a. Elworthii.*

A. a. Elworthii—El-wor′-thĭ-i (Elworthy's), *Moore.*

This singularly striking variety, also known as *Polystichum angulare cruciatum*, and originally found wild near Nettlecombe, is totally different from all other forms at present known. Its curious fronds, which are from 1½ft. to 2ft. long, 2in. to 3in. broad, and of a deep green colour, have each of their pinnæ (leaflets) usually forking, nearly at their base, into two short, spreading parts, each cut into overlapping, spiny-toothed pinnules (leafits). These pinnæ are somewhat distant, but owing to half of them being ascending and the other half descending, they cross each other at right angles and give the frond a crowded appearance. The stalks in this singular variety are throughout very scaly, and the sori (spore masses) are confined to the upper portion of the frond only.—*Lowe*, *Our Native Ferns*, i., p. 153, fig. 131.

A. a. grandiceps—gran′-dic-eps (large-headed), *Wollaston.*

This really superb variety, which is by far the best crested form of *A. angulare* yet discovered, is in general appearance very like a largely crested and lobed form of *A. aculeatum*. Unfortunately, no record of its habitat can be found, and whether it is a natural seedling or a plant raised in cultivation cannot be gathered from any work on the subject. This, however, does not detract from its beauty. Its fronds, of a deep green colour, are only about 1ft. in length and 1½in. to 2in. wide, except at the summit, where they end in a large and rather flat crest 3in. to 5in. wide: this is produced by the repeated forking of the rachis, as each frond, at about three-fourths of its length, divides into two or three branches, each of which is pinnate (divided to the midrib) and spiny-toothed. The primary divisions branch again to the third or fourth degree, each ultimate branchlet ending in a short-forked, spiny-toothed and tufted crest (Fig. 64). Fifty or more of these crestings usually form the termination of the very large, spreading, densely leafy head of each frond.

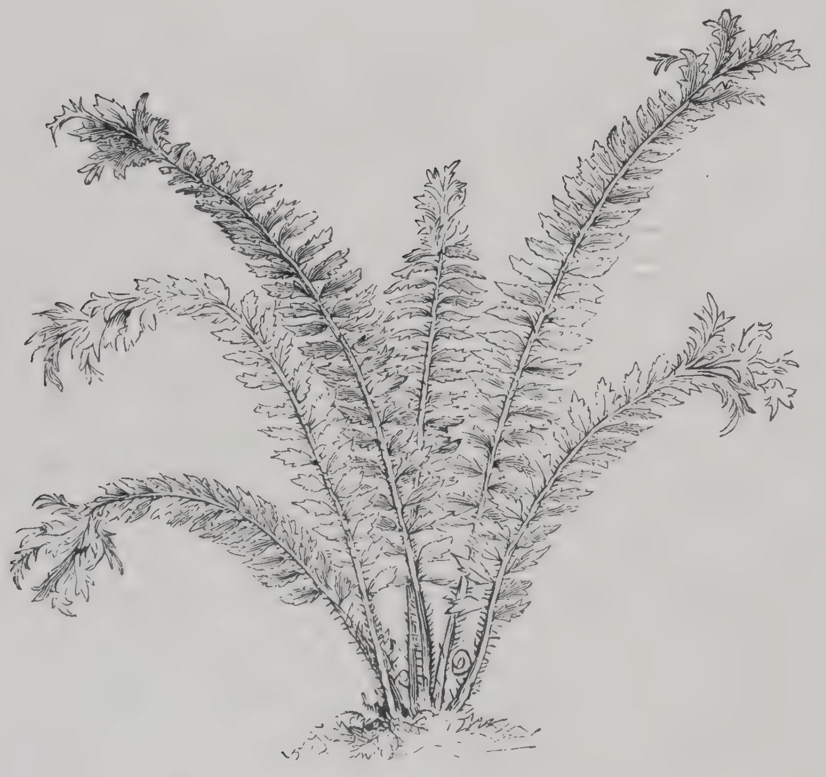


Fig. 64. Aspidium angulare grandiceps (¼ nat. size).

The midribs of the fronds, and all their divisions and branches, are of a yellowish colour, and of a thick, fleshy, and semi-transparent nature.—*Lowe Our Native Ferns*, i., p. 151, fig. 128. *Nicholson, Dictionary of Gardening*, i., p. 126.

A. a. grandidens—gran′-did-ens (strongly toothed), *Moore.*

This singular variety, with the various forms which have been found wild in so many different habitats—in Devonshire, in Somersetshire, near Whitby, at Weston-super-Mare, at Linaskea, in Ireland, &c.—may be said to form a perfectly distinct group in the classification of the varieties of *A. angulare.* The original *A. a. grandidens* was found in Devonshire, and may be described as a rather dwarf form of what is popularly called *Polystichum angulare*, with narrow, spear-shaped fronds. These are from 1½ft. to 2ft. in length, 2in. to 3in. wide, of a thick texture and dark green colour, and in most instances are truncate (terminating abruptly). Their pinnæ (leaflets), which are equally truncate, are of various lengths, and the small and obliquely wedge-shaped pinnules (leafits) are copiously and deeply toothed or cut into two or three sharp, gaping teeth.—*Lowe*, *Our Native Ferns*, i., p. 85, fig. 52.

This curious variety, even when reproduced from spores, is comparatively constant. Among the several forms which, however, have by competent authorities been considered as sub-varieties, the following are the most striking:

A. a. g. angustatum—an-gus-ta′-tum (narrow), *Lowe.*

In this sub-variety the fronds, 1ft. long, scarcely ¾in. broad at the base, and only 2in. in their widest part, are provided with basal leaflets which consist of a pair of stalked, diminutive, cup-shaped leafits. The next few pinnæ have two or three pairs of stalked, rather larger pinnules, and an undivided upper portion. The sori (spore masses) are, in this form, confined to the extremity of the frond and situated on the edge of the pinnules, which are thus almost suprasoriferous (bearing spores on their upper surface).—*Lowe, Our Native Ferns*, i., p. 187.

A. a. g. Baileyanum—Bail-ey-a′-num (Bailey's), *Lowe.*

A very elegant form, of dwarf habit, and very pleasing in shape. Its fronds have their pinnules (leafits) variously cut and show a few large, angular teeth. They are of a remarkably bright shining green colour. This beautiful sub-variety reproduces itself true from spores, which occupy the greater part of the fertile fronds. It is generally, though erroneously, called *A. a. Bayliæ.—Lowe*, *Our Native Ferns*, i., p. 186.

A. a. g. cornutum—cor-nu′-tum (horned), *Lowe.*

This very singular Fern is of slender and dwarf habit. Its curious fronds vary in breadth from less than 1in. to 3½in., and seldom exceed 6in. in height, inclusive of the stalks, which are quite 2in. long; their extremity terminates in a cornute (horn-shaped) appendage, which has all the appearances of an abortive pinnule (leafit).—*Lowe*, *Our Native Ferns*, i., p. 187.

A. a. g. Grayii—Gray′-ĭ-i (Gray's).

This Fern, which is perhaps the prettiest of all those in cultivation, was originally discovered in Devonshire. It is dwarf in habit and nearly normal in outline, although the leaflets are somewhat unequal in length; instead of terminating abruptly like those of the ordinary *A. a. grandidens*, they gradually taper to the apex, where they are very sharp.—*Lowe*, *Our Native Ferns*, i., p. 187.

A. a. imbricatum—im-bric-a′-tum (overlapping), *Moore.*

This thoroughly handsome and distinct variety, which in habit somewhat resembles *A. aculeatum lobatum*, was originally found wild in Somersetshire. Its rich green, bipinnate (twice-divided) fronds, 2ft. long and only about 2in. broad, are borne on very short stalks, and are of a narrow spear-head shape. Their leaflets are blunt, short, and linear-oblong, while their blunt and crowded pinnules (leafits) are conspicuously imbricated (overlapping), and more markedly so on the fronds of the young plants. The stipes (stalks) and the basal portion of the rachis (stalk of the leafy portion) are proliferous, a bulbil being usually found on the larger fronds touching the soil.—*Lowe*, *Our Native Ferns*, i., p. 84, t. 17B.

A. a. indivisum—in-di-vi′-sum (undivided), *Wollaston.*

A robust-growing form, originally found in Somersetshire. Its handsome, spreading, very leafy, deep green fronds, 1½ft. to 2ft. long and about 6in. wide, are borne on long stipes (stalks). Their pinnæ (leaflets) are spear-head-shaped, close, and suddenly taper near the point. The pinnules (leafits) are broad, coarse, more or less overlapping, undivided, slightly toothed, and distinctly stalked; the midrib of each terminating in a prominent spine and the outer base being more or less distinctly lobed.—*Lowe*, *Our Native Ferns*, i., p. 169, fig. 147.

A. a. interruptum—in-ter-rup′-tum (interrupted).

The fronds of this very handsome, constant, and singular form, which was originally found wild at Oldstead, Yorkshire, are from 1ft. to 1½ft. in length, narrow, and somewhat spear-shaped. Although very variable in width, they are always very narrow in their parts, owing to the presence of series of shortened primary divisions, which vary in length to an extraordinary degree and are provided with pinnules (leafits) of an auricled (eared) character, and variously interrupted, especially near the stalk.—*Lowe*, *Our Native Ferns*, i., p. 108, fig. 80.

A. a. latipes—la′-ti-pes (broad-footed), *Moore.*

This very robust variety, originally found at Nettlecombe, in Somersetshire, is remarkable on account of the extraordinary breadth of its fronds, which attain 3½ft. to 4ft. in length and are 10in. or more broad at their base. The pinnæ (leaflets), especially the basal ones, are exceedingly large; they are somewhat distant and taper to a sharp-toothed, long point. The pinnules (leafits) are conspicuously stalked, spiny, small-toothed, and have at their outer base a very prominent, ear-like lobe or auricle. The general outline of the fronds is a very broad lance shape; they are of a very deep green colour, and the stipes (stalks) are profusely covered with pale brown scales about ½in. wide.—*Lowe*, *Our Native Ferns*, i., p. 100, fig. 70.

A. a. lineare—li-nĕ-a′-rĕ (narrow), *Moore.*

This remarkable variety, also known under the name of *A. a. confluens*, is probably the most curious of all the known forms of *A.* (*Polystichum*) *angulare.* It was found wild in Jersey, and also in Ireland, and the Irish plant, though partaking of the same character as the other, is of a much more dwarf and compact habit. The Jersey plant has fronds 2ft. to 3ft. long, and these are rendered very curious through the extreme contraction of the deeply-cut pinnules (leafits), which are much depauperated and of a greyish-green colour. The singular character of these pinnules gives the frond a skeleton-like appearance. The upper part of each pinna (leaflet), to about one-third of its length, is formed by the pinnules merging into one another and forming a saw-edge-like, spiny-toothed, broadish termination, imparting a heavy border to the outline of each frond, which is thus rendered particularly elegant. The sori (spore masses) are situated on the edge of the frond, where they form prominent little dots; these being seen from above add to the interest attached to this extraordinary plant.—*Lowe*, *Our Native Ferns*, i., p. 93, t. 18.

A. a. oxyphyllum—ox-yph-yl′-lum (having sharp-pointed leaves).

An exceedingly fine and elegant variety, of slender, graceful habit, yet of large dimensions, as its fronds, 1½ft. to 2ft. long and 6in. to 9in. wide, are very spreading and partake in their general outline of the feathery character of the better-known *A. a. plumosum*, together with the sharply-pointed and narrow character of the pinnules (leafits) of *A. a. acutum*. The fronds, thrice divided, are of a very scaly nature, and their pinnæ (leaflets) are all more or less overlapping; while the pinnules are profoundly cut in a lobed and attenuated manner, like those of the popular *A. a. proliferum*, which it somewhat resembles, though it is not in any way proliferous.—*Lowe*, *Our Native Ferns*, i., p. 116, fig. 89.

A. a. parvissimum—par-vis′-sim-um (very small), *Gray*.

This very distinct variety, which originated as a seedling in the collection of Mr. R. J. Gray, of St. Thomas', Exeter, is unique in general appearance; for its fronds, which seldom exceed 1ft. in length, are closely congested and taper sharply to a point. The whole plant is of a somewhat rigid, though elegant habit; its numerous and closely-set pinnæ (leaflets) are furnished with very minute, dark green, blunt pinnules (leafits), of a somewhat leathery texture and overlapping each other. This form is a comparatively slow grower, but it possesses the advantage of holding its foliage for a great length of time.

A. a. plumosum—plu-mo′-sum (feathery), *Wollaston.*

This rare, very handsome, and remarkably graceful variety was found wild at Nettlecombe, in Somersetshire; near Barnstaple, and near Ottery St. Mary, in Devonshire, about the same time by as many different collectors. It is a most lovely Fern, of strong dimensions, yet very elegant in habit on account of its spreading fronds, 2ft. to 3ft. long and 6in. to 9in. broad, being of a very feathery nature. They are of a pale green colour and thin texture, bipinnate (twice divided to the midrib), and almost three times divided in the most developed parts. Their general outline is broadly spear-shaped, and their pinnæ (leaflets), more than 1in. wide, slightly decrease in width towards the point. The pinnules (leafits), with which they are abundantly furnished, are conspicuously stalked, curving outward, deeply and symmetrically cut into narrow, spiny-toothed lobes, the larger of which are also often slightly cut. This gives an elegant feathery appearance to the graceful arching fronds, which are produced in great abundance from a short, upright stem.—*Lowe, Our Native Ferns,* i., p. 113, fig. 85.

A. a. polydactylum—pol-yd-ac′-tyl-um (many-fingered), *Moore.*

A constant, distinct, and exceedingly elegant variety, originally found wild in Tipperary. Its slender, narrow, lanceolate (spear-shaped) fronds, 9in. to 12in. long and 2in. to 3in. broad, are furnished with somewhat irregular, stiff pinnæ (leaflets), usually ending in two or three spreading forkings or short branches, from about half their length. Their pinnules (leafits), which show a very distinct stalk and lobe, are proportionately small, and here and there are only rudimentary.—*Lowe, Our Native Ferns,* i., p. 114, fig. 86.

A. a. præmorsum—præ-mor′-sum (bitten off), *Allchin.*

A distinct and very curious variety, found wild in Ireland, also in Hampshire and in Devonshire. It is of dwarf and compact habit, its rather tapering fronds, often irregular in outline, seldom exceeding 1¼ft. in length by 3in. in breadth; they are furnished with shortened or abruptly-terminating leaflets, which, like the pinnules (leaflets), appear as if bitten off.—*Lowe, Our Native Ferns,* i., p. 88, figs. 55 and 56.

A. a. proliferum—pro-lif′-er-um (proliferous), *Moore.*

This singular plant, although simply a variety of *A. angulare*, may be said to form, with the sub-varieties related to it, quite a distinct group of Ferns, distinguished from all others belonging to the same genus through the peculiar habit they possess of producing on their rachis (stalk of the leafy portion), by means of small bulbils, a crop of young plants, by which these forms are most readily propagated. The typical *A. a. proliferum* was discovered at Ide. It is a Fern with narrow fronds of graceful habit, three times divided to the midrib, and viviparous (bud-bearing) in the axils of the lower pinnæ (leaflets), and even occasionally in the axils of the pinnules (leafits). Other forms more or less distinct, but scarcely deserving varietal names, have been found in a wild state at Whitby and near Brighton, while one which was never named or described shows a peculiar appearance through the dense mass of long red scales which covers the rachis, and which is strikingly effective in the lower half of the frond: it was found at Monk Leigh, in North Devonshire. *A. a. proliferum* was found by Dr. Kinahan, as long ago as August, 1849, growing on slate rocks by the side of a stream which, running through Friarstown House demesne, falls into the Dodder, just above Bohernabreena, County Dublin.—*Lowe, Our Native Ferns*, i., p. 80, fig. 48.

The most distinct of the several known forms of *A. a. proliferum* are the following:—

A. a. p. angustatum—an-gus-ta′-tum (narrow), *Stansfield.*

This variety, raised from spores at Todmorden, near Manchester, differs from the typical *A. a. proliferum* in having its fronds, 1ft. to 2ft. long, much narrower, seldom attaining 2in. in breadth. They are bipinnate (twice divided to the midrib), and furnished with short, blunt pinnæ (leaflets); their pinnules (leafits) are slightly eared at the base. This variety is proliferous only at the base of the rachis (stalk of the leafy portion).—*Lowe, Our Native Ferns*, i., p. 176.

A. a. p. Footii—Foot′-ĭ-i (Foot's), *Moore.*

A most elegant and finely-divided variety, found wild in County Clare, Ireland. Its fronds are more triangular than those of the typical form, and are also distinctly tripinnate (three times divided to the midrib); they are very broad when compared with their length, which seldom exceeds 1½ft., and are of a dark green colour; the rachis (stalk of the leafy portion) is thickly covered with brown scales, and abundantly proliferous on nearly its whole length. The habit of this handsome variety is also peculiar, as, instead of growing upright, its plumose fronds spread out horizontally, or, at the most, only slant upwards.—*Lowe*, *Our Native Ferns*, i., p. 104, fig. 75.

A. a. p. Padleyanum—Pad-ley-a′-num (Padley's), *Lowe*.

A very handsome form, normal in outline, originally found at Monkleigh, North Devon. Its fronds, 1½ft. long, are twice divided to the midrib; their pinnæ (leaflets) are opposite on the lower half of the frond and alternate above; they are narrow-lance-shaped, crowded, and strongly auriculate (having a distinctly-marked ear) at the base. This is further distinct from most known varieties by the abundance of long spines noticeable along the margins and at the extremity of each pinnule (leafit).—*Lowe*, *Our Native Ferns*, i., p. 156, fig. 133.

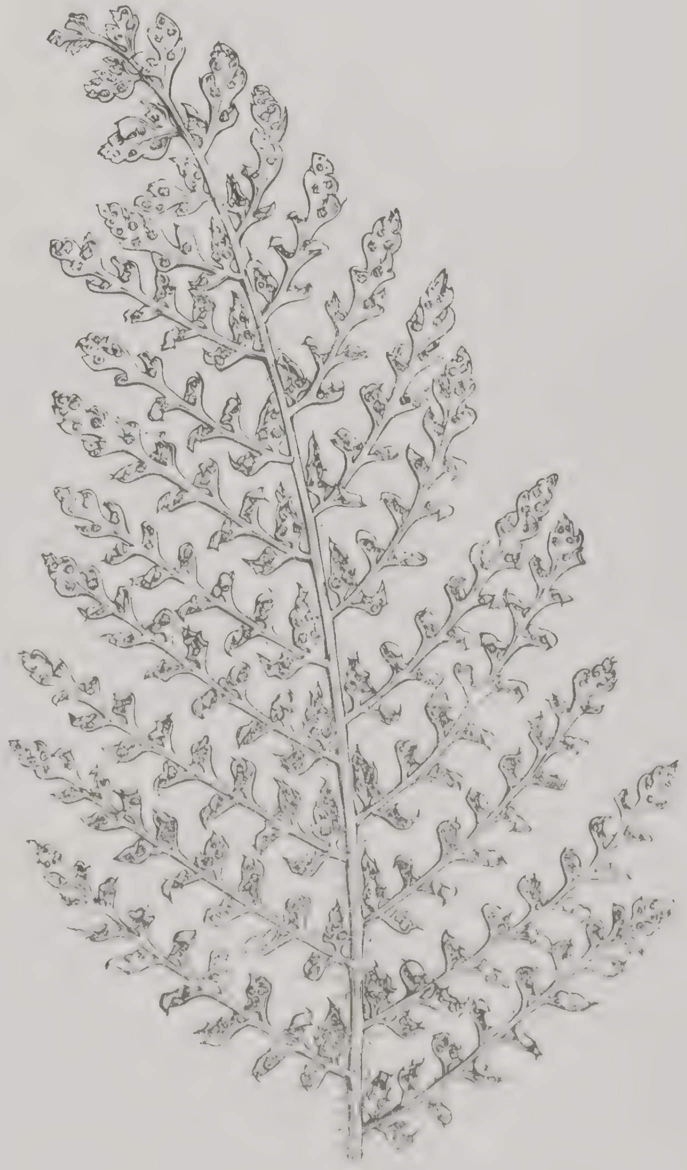


Fig. 65. Portion of Frond of Aspidium angulare proliferum Wollastoni (⅛ nat. size).

A. a. p. Wollastoni—Wol′-las-ton-i (Wollaston's), *Moore*.

This is undoubtedly one of the most beautiful British kinds of *Aspidium*. It was originally found near Ottery St. Mary, in Devonshire, also at Barnstaple and in some parts of North Devon. Though a strong grower, it is very elegant, for its beautiful fronds, 2½ft. to 3½ft. long and 6in. to 9in. broad, are of a somewhat loose habit, very spreading, almost pendent, and of a tapering lance-shaped outline; they are distinctly tripinnate (thrice divided to the midrib), having rather distant, tapering leaflets (Fig. 65), with narrowed, contracted, but not distorted pinnules (leafits), distantly lobed, deeply cut, and conspicuously stalked. The fronds are of a particularly dark green colour and very proliferous (bud-bearing) on the lower half of the stalk of their leafy portion.—*Lowe*, *Our Native Ferns*, i., p. 128, fig. 104.

A. a. pumilum—pu′-mil-um (small), *Moore.*

A very pretty, constant form, of dwarf habit, originally found near Nettlecombe. Its fronds, which have the same bitten-off character as those of *A. a. præmorsum*, are smaller in all their parts, as they seldom attain 9in. in length and 2in. in breadth; they are bipinnate (twice divided), of a deep green colour, and rather wavy or crispy. The fructification is limited to the extremity of the fronds, where only two or three pairs of sori (spore masses) are found at the tips of the leaflets.—*Lowe*, *Our Native Ferns*, i., p. 115, fig. 87.

A. a. ramosissimum—ra-mo-sis′-sim-um (much branched), *Lowe.*

A singularly crested and branched form, originally found wild near Exeter. Its fronds, 1¼ft. to 1½ft. long and 8in. to 12in. broad across the ramose (branched) portion, are very variable; yet they usually branch about 4in. above the base, these branches dividing again about 2in. higher and having a third division from 2in. to 3in. beyond that; further, they are frequently more or less branched again near the summit of the frond. —*Lowe*, *Our Native Ferns*, i., p. 144, fig. 122.

A. a. rotundatum—rot-un-da′-tum (rounded), *Moore.*

This most distinct, comparatively small-fronded, and remarkable Fern, different in general aspect from all other known kinds, was originally found in a wild state near Nettlecombe, in Somersetshire. Its remarkably pretty fronds, 1ft. to 1½ft. long and 3in. to 4in. broad, are narrow spear-shaped, rather spreading, and terminate in a blunt, rounded lobe; they are strictly bipinnate (twice divided to the midrib) and of a deep green colour. The pinnæ (leaflets), closely set and 1½in. to 2in. long, are of nearly even breadth throughout, gradually diminishing in size to less than ½in. long

A Corner of a Cool-house Fernery

next to the densely scaly stalk at the base of the frond. The pinnules (leafits) are frequently almost circular, except near the stalked attachment, where they are more or less wedge-shaped; their margin is short-toothed, but not spiny, as in nearly all other forms of *A. angulare.* The terminal lobe of each pinna is larger, and either shallow fan-shaped or nearly short-triangular and blunt-toothed on the upper margin.—*Lowe, Our Native Ferns,* i., p. 99, fig. 68.

A. a. setaceum—se-ta′-cĕ-um (bristly), *Sim.*

A very interesting, dwarf-growing form, raised from spores at Foot's Cray. Its short, nearly erect fronds, 6in. to 9in. long, are short-stalked, spear-shaped, and bipinnate (twice divided). The pinnules (leafits) are conspicuously stalked, excepting near the margin of the fronds, where they are confluent (merging into a very broad and toothed terminal one). Some of these leafits are sharply lobed, all are deeply toothed, and each tooth bears one long and very prominent, awl-like spine or bristle.

A. a. tripinnatum—trip-in-na′-tum (thrice divided to the midrib), *Moore.*

This beautiful variety, originally found in a wild state in Cornwall, is so distinct in general appearance that, since its discovery, nearly every writer on British Ferns specially mentions it. It is described in Moore's "Nature Printed Ferns," and figured on t. 13B, also in his "Handbook of British Ferns," p. 90. Lowe, in his splendid work on "Our Native Ferns," not only describes it, but gives a coloured illustration of it; he also illustrates it in his "Natural History of British and Exotic Ferns," vi., t. 24, p. 70. The handsome fronds, of a vivid green colour and long-triangular shape, are from 1ft. to 1½ft. long, 4in. to 6in. broad, and have their stipes (stalks) and rachis (stalk of the leafy portion) densely covered with scales of a light brown colour. Their habit is also peculiar, as they rise perpendicularly, thus forming a plant of a narrow "shuttlecock" appearance. The pinnæ (leaflets), 2in. to 3in. long, incline or twist a little out of the flat surface of the frond, and lie nearly horizontally one above another, like so many steps of a ladder; and, being crowded together, when a frond is pressed flat for preservation, the pinnæ overlap each other. The pinnules (leafits) are crowded, rather overlapping, and each superior or upward one next the midrib of the frond is very much lengthened and deeply cut into stalked third divisions, thus making the frond tripinnate.—*Lowe, Our Native Ferns*, i., p. 78, t. 14.

A. a. truncatum—trun-ca′-tum (maimed), *Lowe.*

This remarkable variety, very distinct in general appearance, possesses the property of reproducing itself very true from spores: it was originally found in Ireland, and its distinguishing features are the truncated form of the fronds and of their leaflets. The fronds, of a deep green colour above and paler beneath, are of a very leathery texture, 9in. to 15in. long by 2in. to 3in. broad, and terminate abruptly; they are borne on very stiff and scaly, short stalks, and their pinnæ (leaflets) are furnished with three or four pairs of pinnules (leafits), peculiarly fan-shaped and deeply toothed. The sori (spore masses) in this singular variety being situated on the extreme margin, appear almost as if disposed on the upper surface of the frond. The combination of the above-mentioned distinctive characters renders this singular Fern very interesting.—*Lowe, Our Native Ferns*, i., p. 82, t. 17.

A. a. varians—var′-ĭ-ans (variable), *Wollaston.*

An exceedingly curious variety, with fronds 1ft. to 2ft. long, of a particularly soft texture, and light green in colour. The pinnæ (leaflets), opposite in the lower part of the frond and alternate in the upper portion, affect all sorts of shapes, being variously interrupted, mostly short and blunt, frequently forked, sometimes only rudimentary, or even wanting altogether. The pinnules (leafits) also vary in size, shape, and quantities accordingly, sometimes numbering ten pairs, while the next pinna only bears one pair, or is even reduced to a single pinnule. There also exist a dwarf form found at Littleham in Devonshire, and another, altogether distinct in habit, its fronds being 2ft. to 2½ft. long, found near Exeter, in which, however, the same variable character is observable, and which only differ in their size, no two pinnæ being alike.—*Lowe, Our Native Ferns*, i., p. 105, fig. 76.

A. a. Wollastoni (Wollaston's). The plant popularly designated under this name is one of the several known forms of *A. a. proliferum.*

A. (Euaspidium) angulatum—Eu-as-pid′-ĭ-um ; ang-ul-a′-tum (angular), *John Smith* (*not Hooker*).

A stove species, native of the Malayan Islands, with fronds of a soft, papery texture, 1ft. to 2ft. long, sometimes simple (undivided), usually with one large, heart-shaped, entire terminal pinna (leaflet) and one or two lateral ones on each side of the midrib. The lowest of these, 6in. to 10in. long and 2in. to 4in. broad, are often forked at the base. The stipes (stalks) on which the fronds are borne are 1ft. to 2ft. long, ebeneous, glossy above and scaly below ; the rachis (stalk of the leafy portion) is of similar nature, and the very abundant sori (spore masses) are small and scattered over the whole of the under-side of the frond.—*Hooker, Synopsis Filicum*, p. 258.

A. (Polystichum) anomalum—Pol-ys′-tich-um ; an-o′-mal-um (anomalous), *Hooker and Arnott.*

A very robust, greenhouse species, native of Ceylon, where, according to Beddome, it grows at from 5000ft. to 6000ft. elevation. It produces fronds 2ft. to 3ft. long and 1ft. or more broad, borne on stout, upright stalks, 1ft. to 2ft. long, that are densely clothed, especially in their lower part, with large, spear-shaped scales of a peculiarly light brown colour. The lower pinnæ (leaflets) are 6in. to 9in. long and 2in. to 3in. broad, and the leathery leafits, with blunt or slightly pointed teeth, are spear-shaped in the upper part of the pinnæ, but cut down below into oblong segments. Both surfaces are naked, and the sori (spore masses) are often borne on the upper surface and sometimes quite destitute of an involucre (covering). Of this curious plant Beddome says : "Except in the extraordinary fact of its bearing its sori on the upper side of the frond, it hardly differs from some form of the variable *A. aculeatum*, and is probably an abnormal form of that species." —*Hooker, Species Filicum*, iv., p. 27. *Nicholson, Dictionary of Gardening*, i., p. 126. *Beddome, Ferns of British India*, t. 219.

A. argutum—ar-gu′-tum (sharply-toothed). A variety of *A. aculeatum.*

A. (Polystichum) aristatum—Pol-ys′-tich-um ; ar-is-ta′-tum (awned), *Swartz.*

This handsome and robust, greenhouse species, better known perhaps under the name of *Lastrea aristata*, is a native of Japan, the Himalayas, Norfolk Island, New South Wales, &c. Its very lasting fronds, of a leathery texture, are produced from a thick, creeping rhizome (underground stem), and borne on stiff, upright stalks that are 1ft. to 1½ft. long, and clothed on all their length, but principally in their lower part, with very narrow scales of a dark brown colour. The leafy portion of these fronds is tri- or quadripinnatifid (three or four times divided half-way to the midrib); their lower pinnæ (leaflets), which are the largest and sub-deltoid (nearly like the Greek delta, Δ), are 6in. to 9in. long and 3in. to 4in. broad. The lowest pinnules, which are also the largest, are of similar shape, from 2in. to 4in. long, and copiously furnished around their margin with aristate (awned) teeth. The sori (spore masses) are small, and disposed principally in two rows near the midrib, which is very nearly naked.—*Hooker*, *Species Filicum*, iv., p. 27. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *A. aristatum* of Wollaston and Moore is a variety of *A. angulare.*

A. a. coniifolium—co-ni′-if-ol′-ĭ-um (Hemlock-leaved), *Wallich.*

A. aristatum has produced several varieties: of these *coniifolium* is usually considered as a species, and has been illustrated as such in Lowe's excellent work under the name of *A. coniifolium.* It is an evergreen and very beautiful, stove Fern, native of Ceylon and the Philippine Islands. It differs from *A. aristatum* principally through having its handsome fronds, which are adherent to a small, creeping rhizome, more finely divided. These fronds, of a deep shining green, about 2½ft. long by 1ft. broad at the base, are borne on stipes (stalks) quite 1¼ft. long, and covered with brown hairs which are considerably longer near the base. The basal pinnules (leafits) are very large, and the sub-divisions are throughout copiously toothed. The very abundant sori (spore masses) eventually merge into one another, cover the whole under-side of the frond, and very nearly touch each other before shedding the kidney-shaped indusium (covering): though white when only partly developed, they are of a reddish-brown colour when mature.—*Lowe*, *Ferns British and Exotic*, vi., t. 39. *Hooker*, *Synopsis Filicum*, p. 255. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. a. variegatum—var-ĭ-eg-a′-tum (variegated), *Moore.*

This very handsome Fern, of Japanese origin and of great decorative value, is much better known under the name of *Lastrea aristata variegata*:

it needs no further proof of its excellence than the great esteem in which it is held by the public as a plant of first-class quality for indoor decoration. It is quite as hardy and quite as free a grower as the species from which it has issued, although of smaller dimensions, as its fronds, which are also tripinnatifid (three times divided to the midrib) and of an equally leathery texture, seldom attain more than 1½ft. in length; their leafy portion, nearly trapeziform, is of a dark, glossy green, with a whitish band running all along the centre of each leaflet (Plate, for which we are indebted to Messrs. W. and J. Birkenhead). The pinnules (leafits) are very sharply toothed on their edges, and the fronds, as in the original species, are produced from thick, underground rhizomes (creeping stems).—*Nicholson, Dictionary of Gardening*, i., p. 126.

It is worthy of special notice that this variety reproduces itself freely and quite true from spores, and also that, although the contrast between the colours of the centre and of the sides of the pinnæ is much more marked in specimens which have been subjected to a little heat, this plant succeeds admirably in the greenhouse, and is even perfectly hardy in several favoured counties, such as Cornwall, Devonshire, and Somersetshire: it has withstood 20deg. of frost in the East of France.

A. (Polystichum) auriculatum — Pol-ys′-tich-um; aur-ic-ul-a′-tum (eared), *Swartz.*

This vigorous-growing, greenhouse Fern, of medium dimensions, has a very extensive range of habitat, for it is found throughout India and Ceylon; on the Himalayas it has been collected up to 9,000ft. high, and, according to Beddome, it is also very common on the higher ranges of the Neilgherries and other lofty mountains on the Western side of the Madras Presidency. Its leathery fronds, 1ft. to 1½ft. long and 2in. to 4in. broad, are borne on tufted stipes (stalks) 4in. to 6in. long, and are scaly below and sometimes throughout. The numerous pinnæ (leaflets), sub-sessile (almost stalkless) and closely set, are 1½in. long and about ½in. broad; they are somewhat falcate (sickle-shaped) and very sharp-pointed, their edges not being lobed, but simply finely toothed: the upper one shows a prominent auricle (ear), while the lower one is truncate in a horizontal line at the base. The sori (spore masses) are disposed in two distinct rows. — *Hooker*, *Species Filicum*, iv., p. 11. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Beddome*, *Ferns of Southern India*, t. 120.

This species is very variable: according to Beddome, the normal form, which has fronds simply pinnate (once divided to the midrib), is the only one found in Southern India, while in some of the forms found in Northern India the fronds are frequently twice pinnate. The following are the most distinct varieties of *A. auriculatum:*

A. a. lentum—lent′-um (pliant), *Don.*

This variety differs from the species through its pinnæ (leaflets) being cut into oblong, mucronate (pointed) lobes about half-way down to the rachis (stalk of the leafy portion), the auricle (ear) being sometimes quite free.—*Hooker*, *Synopsis Filicum*, p. 251. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. a. marginatum—mar-gin-a′-tum (margined), *Wallich.*

A variety with fronds of a more leathery texture than those of the type, the upper edge of the pinnæ (leaflets) being also slightly lobed.—*Hooker*, *Synopsis Filicum*, p. 251. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. a. obliquum—ob-li′-qŭ-um (oblique), *Don.*

This variety, native of the Himalayas, is of smaller habit than the type, being seldom more than 6in. in height. It is also simply pinnate (once divided to the midrib), and its leaflets, shorter and broader than those of *A. auriculatum*, are narrowed more suddenly to an often bluntish point, and are more bluntly toothed.—*Hooker*, *Synopsis Filicum*, p. 493.

A. biaristatum—bĭ-ar-is-ta′-tum (twice awned), *Blume.*

This is a mere form of *A. aculeatum*, with large pinnules (leafits) aristate (awn-like) at their point and at their auricle or base.

A. brachiatum—brach-ĭ-a′-tum (brachiate). A variety of *A. angulare.*

A. (Cyrtomium) caducum—Cyr-tom′-ĭ-um; cad-u′-cum (deciduous, or ready to fall), *Wallich.*

A very handsome species, native of the Himalayas, where it is found at 7000ft. elevation, also, according to Beddome, of the Khasya Hills, where the plant used for his illustration was gathered in a wild state. The fronds, of a coriaceous (leathery) texture, 1½ft. to 2ft. long and 6in. to 9in. broad, are borne on firm, erect stipes (stalks) 1ft. long, stramineous (straw-coloured) and scaly in the lower portion. They are simply pinnate (only once divided to the midrib), and furnished on each side with numerous stalked, spear-shaped leaflets 4in. to 6in. long and 1½in. broad, which terminate in a long, tapering point. The edges are almost entire or more or less deeply lobed, sometimes down to the rachis (stalk of the leafy portion) below. The midrib is often covered beneath with small scales. The particularly large sori (spore masses) are disposed in one or two rows on each side of the midvein of the pinnæ (leaflets). — *Hooker*, *Species Filicum*, iv., p. 39. *Beddome*, *Ferns of British India*, t. 45.

A. (Euaspidium) cæspitosum — Eu-as-pid′-ĭ-um ; cæs-pit-o′-sum (tufted), *Wallich.*

A greenhouse species, plentiful in North India, especially on the Himalayas, where it is found at various elevations between 4000ft. and 10,000ft. ; also in Nepaul, Simla, &c. It is of comparatively dwarf habit, as its fronds, seldom more than 8in. long, are borne on stems 4in. to 6in. long, smooth, except at their base, which, like the short, thick rhizome (prostrate stem) from which they are produced, is clothed with ciliated (fringed) scales of a light brown colour.—*Beddome*, *Ferns of British India*, t. 33.

A. (Euaspidium) calcareum — Eu-as-pid′-ĭ-um ; cal-ca′-rĕ-um (calcareous or limy), *Presl.*

This stove species, native of the Philippine Islands, is of medium dimensions, its fronds, 1ft. long and 6in. to 9in. broad, being borne on tufted, naked stalks 4in. to 6in. long only ; their upper portion is pinnatifid (divided half-way to the midrib), but their lower portion is furnished with four to six stalked pinnæ (leaflets) on each side of the midrib. The lowest leaflets are cut down to the rachis (stalk of the leafy portion) into stalked, spear-shaped, pointed, deeply and bluntly-lobed pinnules (leafits) of a somewhat leathery texture. The sori (spore masses), disposed in two rows on each side of the midvein, are provided with an orbicular involucre (globular covering).—*Hooker*, *Species Filicum*, iv., p. 46.

A. (Polystichum) capense—Pol-ys′-tich-um; ca-pen′-sĕ (from the Cape), *Willdenow.*

Although its specific name seems to indicate that this handsome and very useful, greenhouse species is a native of the Cape of Good Hope, it is, or has been, found in a wild state in various other places: thus it is found in America from Cuba to Patagonia, in the Polynesian Islands, in New Zealand and Australia, as well as in Cape Colony, Natal, and the Mascarene Islands. Its handsome fronds, of a very leathery texture and of a shining nature, have both surfaces naked; their leafy portion, subdeltoid (in form almost like the Greek delta, Δ), tripinnate (three times divided to the midrib), 1ft. to 3ft. long and 1ft. to 1½ft. broad, is borne on a firm, erect, greyish stalk, densely scaly below. The lowest pinnæ (leaflets), which are the largest, frequently measure 6in. to 10in. long by 3in. to 4in. broad; they are oblong-spear-shaped, sharp-pointed, wedge-shaped at the base, and have bluntly-lobed segments. The large and abundant sori (spore masses) are disposed in two rows nearly filling the space between the midrib and the edge. In gardens this species is also known as *A. coriaceum.*—*Hooker, Species Filicum,* iv., p. 32. *Nicholson, Dictionary of Gardening,* i., p. 126. *Lowe, Ferns British and Exotic,* vi., t. 40.

A. caryotideum—car-ў-o-tid′-ĕ-um (Caryota-like). This is a variety of *A. falcatum.*

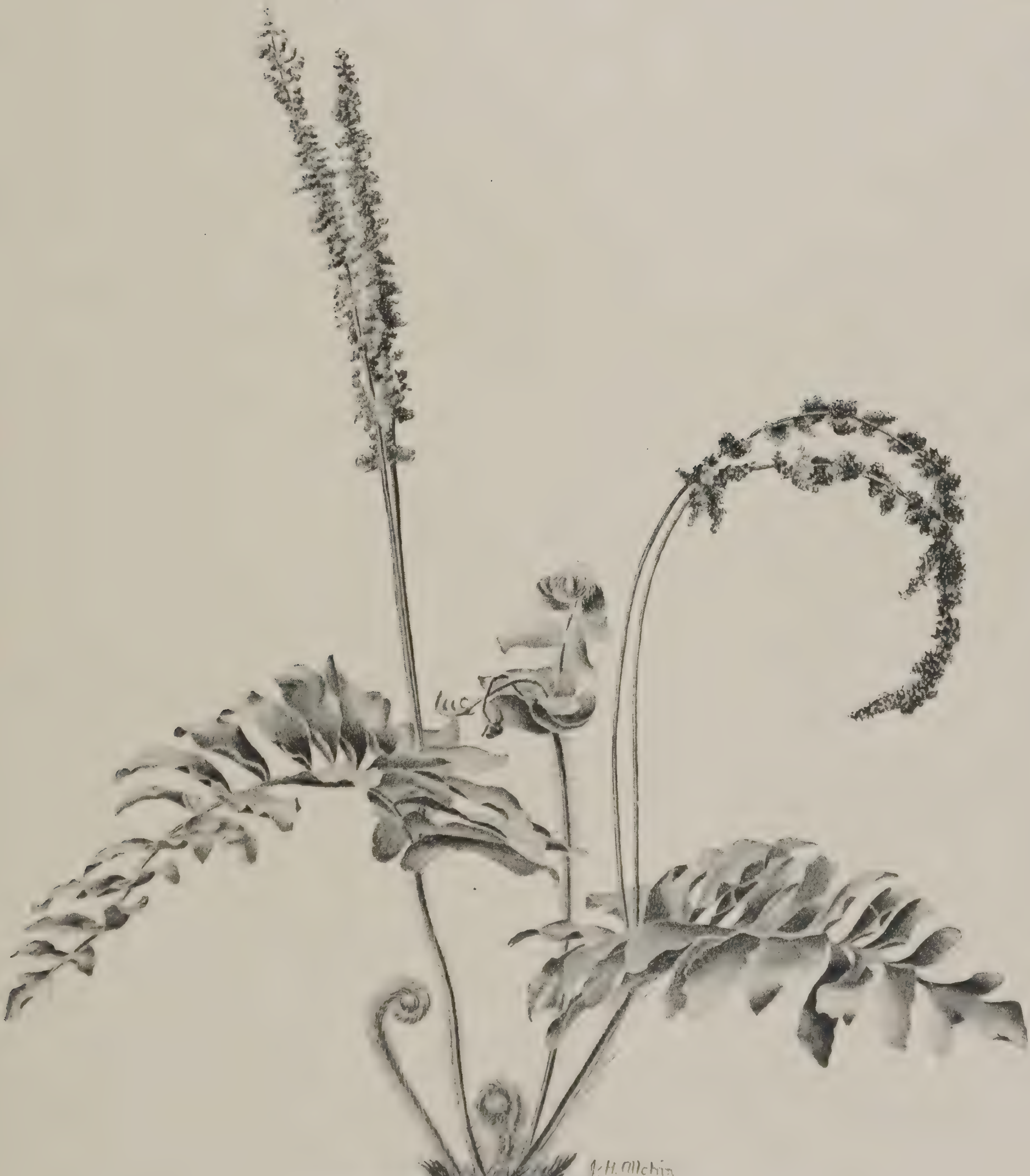
A. confertum—con-fer′-tum (compressed), *Hooker and Greville.* Synonymous with *A. meniscioides.*

A. coriaceum—cor-ĭ-a′-cĕ-um (leathery), *Swartz.* A garden name for *A. capense.*

A. cristatum—cris-ta′-tum (crested). A name applied to varieties of *A. aculeatum* and *A. angulare.*

A. (Cyrtomium) falcatum—Cyr-tom′-ĭ-um; fal-ca′-tum (hooked or sickle-shaped), *Swartz.*

The Ferns belonging to the *Cyrtomium* section form a small group of most useful subjects in the genus *Aspidium*, but this species and its several varieties surpass all others in being best adapted for indoor decoration.



Anemia collina

(½ nat. size).

On account of their rapid growth and of the firm texture of their fronds, they are indeed the best Ferns for use in the least-favoured places—in rooms and on staircases—where their leathery foliage of distinct and handsome appearance seems to defy the deadly influences of draughts, and some, of even gas, better than that of any other Ferns with which we are acquainted. Their bold foliage makes a striking contrast with that of the more finely-cut species when planted out in the cold Fernery, in which place, and under which treatment, they develop into handsome specimens in an incredibly short space of time, and show themselves off to great advantage. For that special purpose they all are of great value, as by the use of them we are enabled to give additional charm to the rockery not heated artificially, but simply covered with glass; there, being evergreen, they retain their beauty during the whole of the winter months.

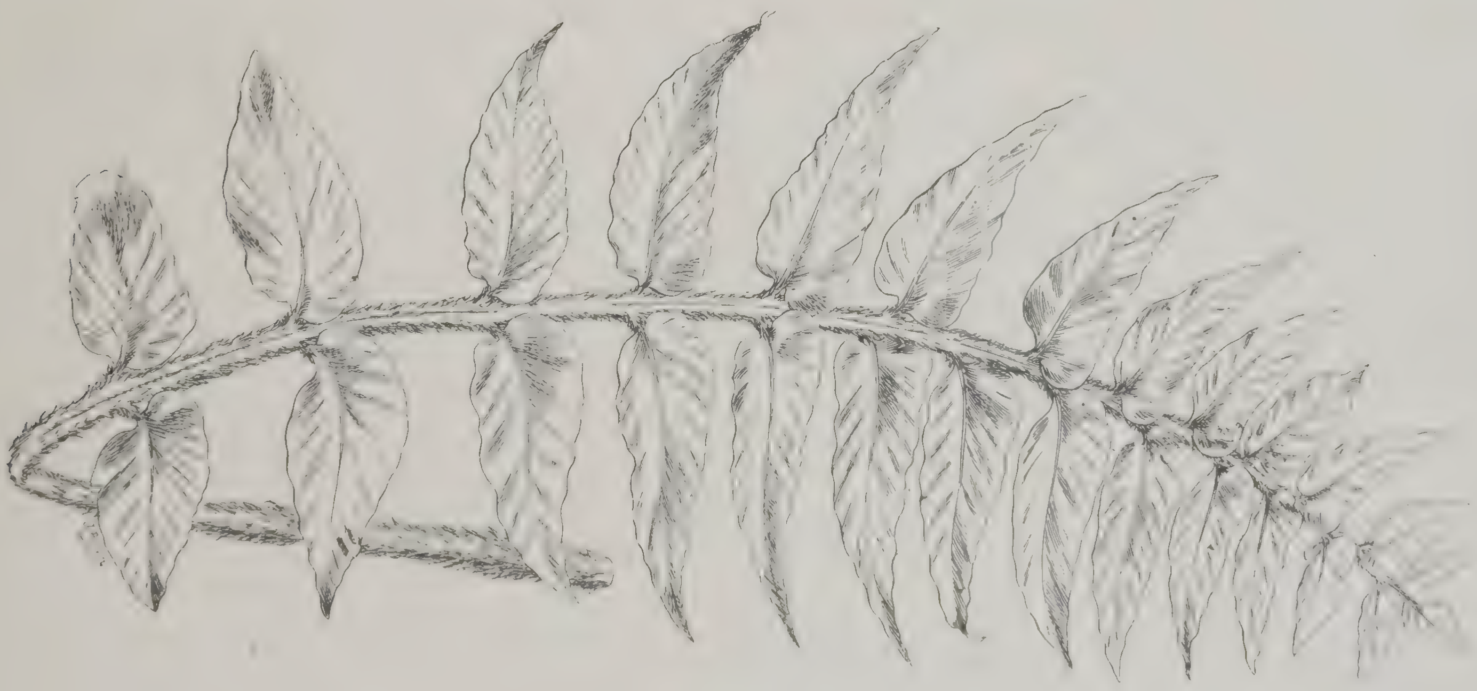


Fig. 66. Frond of Aspidium falcatum
(¼ nat. size).

The culture of *A. falcatum* and its allies is very simple, and their requirements are limited. The soil which suits them best is a compost of about equal parts of loam, peat, and silver sand, but care must be taken that they are not potted hard, or, if planted out in the Fernery, that the soil immediately around them is kept moderately loose. They require a good supply of water at the roots in the growing season, and during that time frequent syringings are also beneficial, but they should be watered sparingly during the winter, when the foliage should also be kept dry. It must also be borne in mind that, although subject to thrips, Cyrtomiums will not get infested with them when not grown in heat. All are readily propagated from spores, which are produced abundantly and germinate very freely.

Although all known forms of *Cyrtomium falcatum* are, in commerce, considered as so many species, they are simply varieties of *A. falcatum*, a species with a very wide range of habitat, being known as a native of Japan, China, the Himalayas, Neilgherries, &c. Its handsome fronds, 1½ft. to 2½ft. long and 6in. to 9in. broad, are borne on stout stalks 6in. to 10in. long, and densely clothed, especially at the base, with large scales of a light brown colour. They are produced from a very stout crown of a particularly scaly nature, and are spear-shaped, simply pinnate (once divided to the midrib), and of a shining dark green colour, approaching that of the Portugal Laurel, but paler underneath. The numerous pinnæ (leaflets) are stalked at the base of the frond, but sessile (stalkless) in its upper half (Fig. 66); they are sickle-shaped, 4in. to 6in. long, 1in. to 2in. broad, sometimes auricled (eared), the lower side rounded or obliquely truncate at the base. The sori (spore masses) are bold and pretty, being thickly scattered over the whole under-surface of the frond. Although generally considered as a greenhouse Fern, this species has proved perfectly hardy and stood several consecutive winters out of doors, in various parts of England, Ireland, and Wales, without artificial protection, and yet remained uninjured. In these cases, however, it became deciduous, the fronds being annually cut off by the frost; but the vigour of the plants did not suffer through this loss of foliage, which corresponds with a similar treatment natural to our common Prickly Shield Fern.—*Hooker*, *Species Filicum*, iv., p. 40. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Lowe*, *Ferns British and Exotic*, vi., t. 9.

A. f. caryotideum—car-ȳ-o-tid′-ĕ-um (Caryota-like), *Wallich.*

This variety, of Japanese origin, which, in commerce, is erroneously known as *Cyrtomium Fortunei*, is totally distinct from the species in its drooping habit and also in the colour and shape of its fronds, which, instead of being dark green, are of a most conspicuous light green tint. They are produced from a thick, fleshy crown, and are simply pinnate (only once divided to the midrib); but their pinnæ (leaflets) are much larger, sharply toothed, slightly lobed, and of quite a peculiar and distinct shape, through their being strongly auricled on both sides at the base. This form has quite a different aspect from all other Ferns in cultivation, and requires very little care in its management, being quite as hardy as the species.—*Hooker*, *Synopsis Filicum*, p. 257. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. f. Fortunei—For-tu′-nĕ-i (Fortune's), *John Smith.*

This variety, native of Japan, and known in commerce as *Cyrtomium Anomophyllum*, differs from the type in having the pinnæ (leaflets) narrower and more opaque. The fronds, which are produced in greater quantities, are also of a more upright habit, 2ft. to 2½ft. long, and their pinnæ (leaflets), slightly auricled at the base, are of a rather thin texture, and of a dull dark green colour when matured, but prettily mottled with lighter green in their young state. *Fortunei* is quite as hardy as the species, and reproduces itself true from spores.—*Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. f. pendulum—pen′-dul-um (hanging down), *Schneider.*

This garden variety, raised by Mr. J. Naylor, of Harrow, appears to partake in about equal degrees of the characters of those previously described, from which, however, it is totally distinct. Its elegant fronds, 1ft. to 1¼ft. long and about 6in. broad, are borne on stipes (stalks) 5in. to 6in. long and of a slightly scaly nature, except at the base, where the scales, of a light brown colour, are both large and numerous. The pinnæ (leaflets), in shape like those of *A. f. Fortunei*, but wedge-shaped at the base instead of being partly stalkless, are short-stalked on the whole length of the frond; they are of a leathery texture, yet shining like those of the typical *A. falcatum.* The distinguishing character of this variety, however, resides in the general habit of the plant, which is gracefully pendulous (see Plate), and becomes still more so as it attains a greater development; the rachis (stalk of the leafy portion) of the fertile fronds being of a peculiarly zigzag nature and more gracefully arching than that of the barren ones. This remarkable variety, like the preceding ones, reproduces itself quite true from spores, which are plentiful and germinate very freely.

A. falcinellum—fal-cin-el′-lum (finely hooked), *Swartz.*

This pretty, greenhouse species, of medium growth, native of Madeira, has oblong-spear-shaped fronds of a very leathery texture, 1ft. to 1½ft. long and 4in. to 6in. broad, borne on somewhat slender stipes (stalks) 4in. to 8in. long, densely clothed, especially below, with spear-shaped scales of a blackish-brown colour. The central pinnæ (leaflets) are about 3in. long and ¼in. broad, but they gradually become smaller towards the base and summit of the frond; they are all short-stalked, their upper side is bluntly eared and their lower one obliquely truncate at the base, and their edge is finely toothed like a saw. The bright green colour of the fronds, and the bold nature of their large sori (spore masses), which are disposed in two long rows, covered by conspicuous indusia, render this Fern one of the most attractive of the whole genus.—*Hooker*, *Species Filicum*, iv., p. 10. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Lowe*, *Ferns British and Exotic*, vi., t. 7.

A. (Polystichum) flexum—Pol-ys′-tich-um; flex′-um (bending), *Kunze.*

A noble, evergreen, stove species, native of Juan Fernandez Island, and somewhat resembling *A. capense* in general aspect, though quite different in details. Its fronds, 2ft. to 3ft. long and 9in. to 12in. broad, are borne on scaly stalks about 1ft. long; they are triangular in shape, erect, stout, of a dull green colour, and tripinnate (three times divided to the midrib). Their lower pinnæ (leaflets), 6in. to 9in. long and 4in. to 6in. broad, are spear-shaped, and their pinnules (leafits), of similar shape and of a leathery texture, are cut down to the rachis (stalk of the leafy portion) below into oblong, bluntly-lobed segments ½in. long, ¼in. broad, and slightly recurved. The sori (spore masses) are disposed in two rows, and occupy nearly the whole of the space between the edge and the midrib. The stipes (stalks) and the rachis are everywhere hairy; they are also provided with broad, dark scales scattered here and there, darker and larger near the base.—*Hooker*, *Species Filicum*, iv., p. 33, t. 229. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Lowe*, *Ferns British and Exotic*, vi., t. 36.

A. (Polystichum) fœniculaceum—Pol-ys′-tich-um; fœ-nic-ul-a′-cĕ-um (Fennel-leaved), *Hooker.*

This greenhouse species, native of Sikkim, where it is found growing wild at various elevations between 7000ft. and 10,000ft., has fronds 1ft. to 2ft.

long and about 1ft. broad, spear-shaped, and simply pinnate (once only divided to the midrib); they are borne on stalks 6in. to 10in. long, densely clothed below with spear-shaped scales of a reddish-brown colour, and proceed from an underground, creeping rhizome (prostrate stem). The lower pinnæ (leaflets), 6in. to 8in. long and 3in. to 4in. broad, are divided into leafits which sometimes are again pinnatifid. They are of a sub-coriaceous (almost leathery) texture, have both surfaces glossy, and the sori (spore masses) are disposed singly on their under-surface.—*Hooker*, *Species Filicum*, iv., p. 36, t. 237. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. Footii—Foot′-ĭ-i (Foot's). A variety of *A. angulare proliferum.*

A. (Polystichum) frondosum—Pol-ys′-tich-um; fron-do′-sum (leafy), *Lowe.*

A beautiful, evergreen species, native of Madeira. Its fronds, 1ft. to 2ft. long and 9in. to 12in. broad, are of a rich, shining green colour; they are borne on strong, straw-coloured or pale brown stipes (stalks) 1ft. to 2ft. long, of a polished nature in general, but densely scaly below. The lowest pinnæ (leaflets), which are by far the largest, measure from 6in. to 12in. in length and 3in. to 4in. in breadth, and are borne on comparatively long footstalks. Their pinnules (leafits), of a somewhat leathery texture, are spear-shaped, very unequal-sided, pinnatifid (divided only half-way to the midrib), with rounded lobes terminating in sharp-pointed teeth, and obliquely truncate at the base below. The sori (spore masses) are plentifully produced, and are disposed principally in two rows close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 31. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Lowe*, *Ferns British and Exotic*, vi., t. 43.

A. (Polystichum) glandulosum — Pol-ys′-tich-um; glan-dul-o′-sum (furnished with glands), *Hooker and Greville.*

This small, stove species, native of Cuba and Jamaica, is very distinct from all others on account of its fronds, about 6in. long by 1in. broad, being covered on both surfaces with fine glands of a hairy nature; they are borne on very short stalks, are oblong-spear-shaped, tapering at both ends, and are cut down nearly to the midrib into bluntly-undulated, oblong lobes of soft texture and bright green colour. The sori (spore masses), of which there are from two to eight to each pinna, are disposed midway between the midrib and the edge.—*Hooker*, *Species Filicum*, iv., p. 6.

A. grandiceps—gran′-dic-eps (large-headed). A name applied to varieties of *A. acrostichoides* and *A. angulare.*

A. heracleifolium—he-rac-le-if-ol′-ĭ-um (Heracleum-leaved). A variety of *A. trifoliatum.*

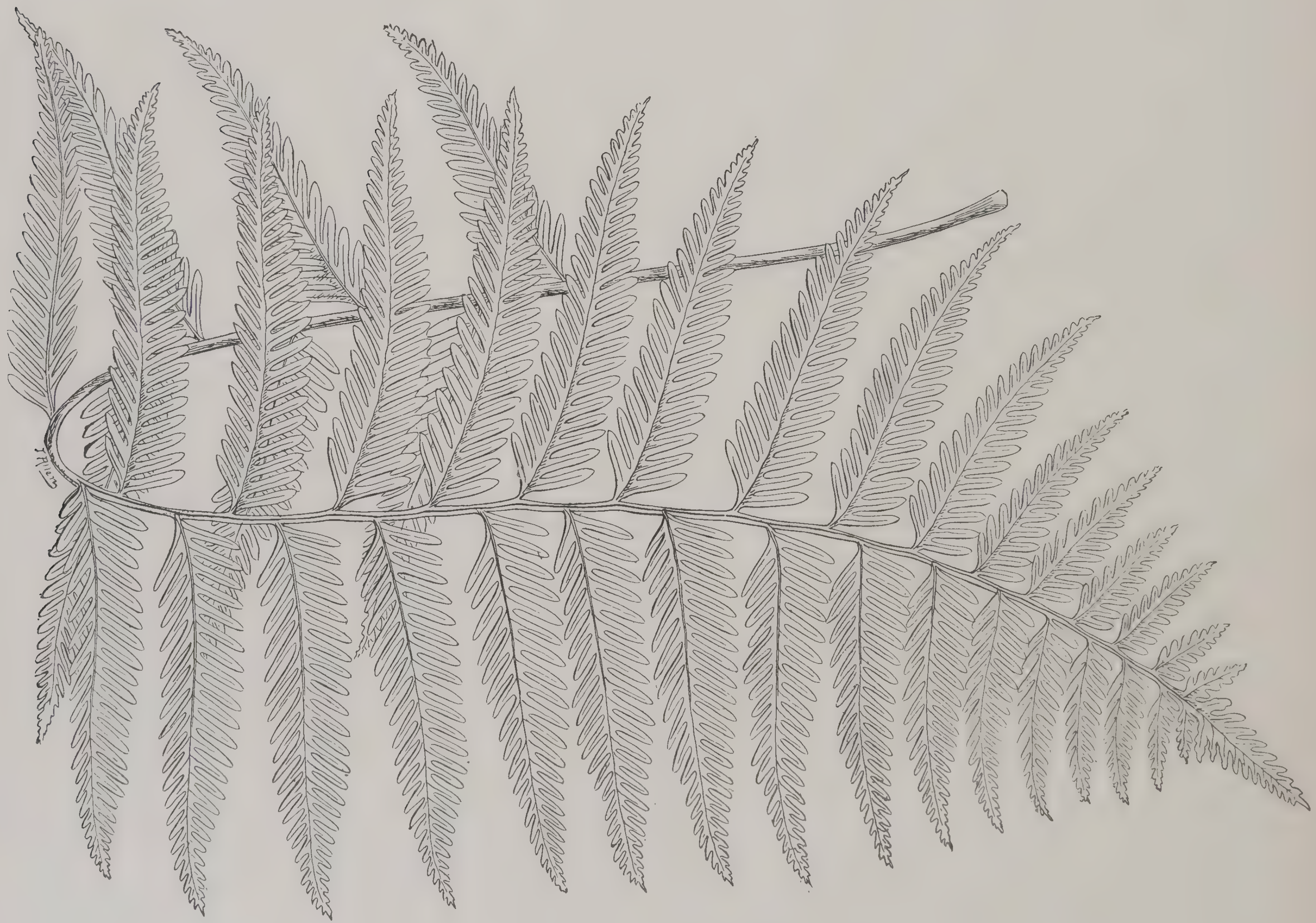


Fig. 67. Frond of Aspidium Hookeri
(⅓ nat. size).

A. (**Cyclodium**) **Hookeri**—Cy-clo′-dĭ-um ; Hook′-er-i (Hooker's), *Baker.*

This evergreen, stove Fern, native of the Malay Archipelago, has entirely the habit of an ordinary Nephrodium, and is of a similarly soft texture ; but it is essentially different therefrom through the involucre (covering of the spore masses) being quite that of an Aspidium. Its fronds, 2ft. to 3ft. long and about 1ft. broad, soft and of a light green colour, are borne on upright, naked stalks about 1ft. long. Their pinnæ (leaflets), which at the base of the fronds are diminutive and deflexed (bent downwards), gradually increase in length towards the middle of the frond, where they measure from 6in. to 8in. From that point and all along the upper portion of the frond they are auricled and pinnatifid (eared and cut nearly to the midrib), and become gradually smaller as they reach the summit of the frond (Fig. 67). The sori (spore masses), covered by an orbicular involucre, reddish in the centre, are scattered over the whole under-side of the upper half of the fronds. *A. Hookeri* is also known as *A. nephrodioides.—Hooker*, *Species Filicum*, iv., p. 42, t. 235. *Lowe*, *Ferns British and Exotic*, vi., t. 48. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. (Polystichum) ilicifolium—Pol-ys′-tich-um ; i′-lic-if-ol′-ĭ-um (Holly-leaved), *Don.*

A greenhouse species, native of various parts of Northern India—Nepaul, Kumaon, Simla, &c.—where, according to Beddome, it is found at an elevation of 9000ft. Although of comparatively small dimensions, this Fern greatly resembles some of the forms of *A. aculeatum* and *A. auriculatum*. Its fronds, of a particularly leathery texture, 6in. to 9in. long and 1in. to 2in. broad, are borne on slender, densely-tufted stalks 2in. to 4in. long only, and clothed throughout with large scales of a light brown colour. Their pinnæ (leaflets), somewhat spear-shaped and about ¾in. long, are sharply pointed and cut into spear-shaped and pointed lobes. The sori (spore masses) are principally disposed in two rows near their midrib.—*Hooker*, *Species Filicum*, iv., p. 12, t. 214. *Beddome*, *Ferns of British India*, t. 31.

A. interruptum—in-ter-rup′-tum (interrupted). A name applied to varieties of *A. aculeatum* and *A. angulare.*

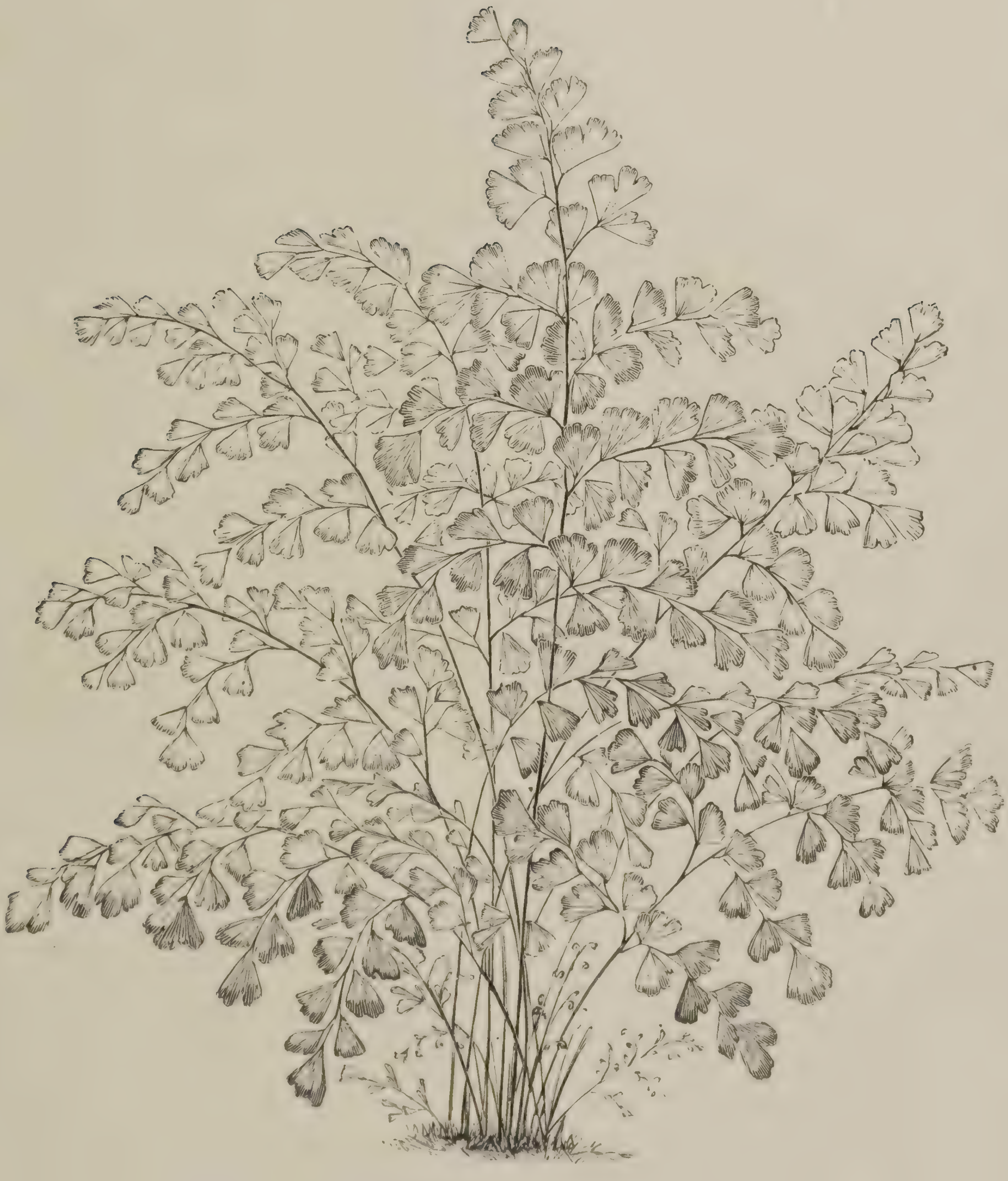
A. (Cyrtomium) juglandifolium—Cyr-tom′-ĭ-um ; ju-glan-dif-ol′-ĭ-um (Walnut-leaved), *Kunze.*

This stove species, of singular appearance, has a wide range of habitat, as it is found wild from Mexico to Venezuela. According to Eaton, it is very common in Western Texas, at Van Horn's Wells, and at the Huecco Tanks.

Its fronds, which sometimes attain 3ft. in length and 1ft. in breadth, are borne on stipes (stalks) 1ft. long, and clothed below with large, egg-shaped scales, which, like those of the upright and somewhat woody rootstock, are of a dark brown colour, marked by a peculiar darker colour still in their central spot, and gradually wear off as the fronds get mature; they are simply pinnate (only once divided to the midrib), of a coriaceous (leathery) texture, and everywhere bordered by a narrow, cartilaginous (gristly) edge, which is extended into sharp teeth, especially towards the ends of the pinnæ (leaflets); both surfaces are smooth and shiny. These pinnæ, short-stalked at the base and stalkless towards the summit of the frond, are narrow-spear-shaped, 4in. to 6in. long and about 1in. broad, and disposed from six to twelve on each side of the midrib, besides a terminal one, which is longer and a little larger than the others. The sori (spore masses) are usually disposed in a row on each side of the midrib and at a little distance from it; but there is frequently outside of each of these rows a second and less complete one of more or less scattered sori: these sori are covered by an orbicular indusium, which is quite peltate (attached to the frond by its centre). In its natural habitats this Fern is of very variable dimensions; thus, while in Venezuela it attains the height of 3ft., it is commonly of lower stature in Mexico, and the Texas plant is seldom above 1ft. high, stalk included.—*Hooker*, *Species Filicum*, iv., p. 38. *Eaton*, *Ferns of North America*, ii., t. 75.

A. (Polystichum) lachenense—Pol-ys′-tich-um; lach-en-en′-sĕ (from Lachen), *Hooker*.

A greenhouse species, of small dimensions, native of the Sikkim and Himalayan Mountains, where it is found wild at elevations varying between 13,000ft. and 16,000ft. Its pretty little fronds, of a leathery texture, 4in. to 8in. long and about ¾in. broad, are borne on stout, black stems 2in. to 4in. long, clothed below with large, spear-shaped scales; these fronds are pinnate (once only divided to the midrib), and the pinnæ (leaflets), ¼in. to ½in. long, have their sides equal, their point bluntish, and their edge serrated (toothed like a saw). The sori (spore masses) are produced in great abundance, often covering the whole under-surface of the pinnæ.—*Hooker*, *Species Filicum*, iv., p. 8, t. 212.



Adiantum rubellum

(½ nat. size).

A. (Polystichum) laserpitiifolium — Pol-ys′-tich-um; la-ser-pi′-tĭ-if-ol′-ĭ-um (Laserpitium-leaved), *Mettenius.*

This very handsome, greenhouse Fern, much better known under the popular name of *Lastrea Standishii*, is a native of Japan, and has proved perfectly hardy in several favoured parts of England and Ireland. It is a species of robust growth and very elegant habit, producing from a slowly-creeping rootstock of a woody nature, roughly scaly, and remaining on the surface of the ground, fronds which frequently measure 2½ft. in length by 1½ft. in breadth at their widest part, and which are borne on stout, fleshy stipes (stalks) quite 1ft. long and of a light green colour. The leafy part of the frond, of a somewhat broad-spear-shaped form, is tripinnate (three times divided to the midrib), being abundantly furnished with spear-shaped pinnæ (leaflets), which are in their turn subdivided into pinnules (leafits) of the same shape and of leathery texture, so closely set as to be imbricated (overlapping), and these being very numerous and bluntly lobed, give the whole plant a very massive, though feathery and beautiful, appearance. Although this is a strong-growing and a very easily-cultivated Fern, there is nothing rigid or coarse about its foliage: on the contrary, the fronds, especially those produced under cool greenhouse treatment, have a most elegant habit, and being of a pleasing light green colour, it is not surprising to find that, under the common name *Lastrea Standishii*, it is a general favourite wherever an attempt is made at securing first-rate Ferns for the decoration of the greenhouse, the cool rockery, or the conservatory.—*Hooker*, *Synopsis Filicum*, p. 254. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. lentum—len′-tum (pliant). A variety of *A. auriculatum.*

A. (Polystichum) lepidocaulon — Pol-ys′-tich-um; lep-id-oc-au′-lon (scaly-stemmed), *Hooker.*

A very interesting, greenhouse species, native of Japan and Tsus-Sima, with fronds of a dark green and shiny nature and of a leathery texture, like those of the popular *A.* (*Cyrtomium*) *falcatum*, but usually much longer, drooping, and rooting at their extremity. These fronds, 1½ft. to 2ft. long and 4in. to 6in. broad, borne on weak or flexible stipes (stalks) 6in. to 9in. long and densely clothed with large, heart-shaped scales of a brown colour, are simply pinnate (only once divided to their midrib). The pinnæ (leaflets), 2in. to 3in. long and ½in. broad, are sickle-shaped, with their two sides unequal, the upper side being conspicuously auricled (eared) at the base. The sori (spore masses) are disposed in two rows at a short space from the midrib. The most remarkable peculiarity of this Fern is that the upper part of its fronds is totally unprovided with leaflets, and terminates in a long-tailed process, producing at the extreme end a solitary bulbil, which later on develops into a perfect plant. It is particularly well adapted for growing in a basket or on a bracket, or for suspension of any kind, in which position it thrives well and shows itself off to great advantage.—*Hooker*, *Species Filicum*, iv., p. 12, t. 217. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. lineare—li-nĕ-a′-rĕ (narrow). A variety of *A. angulare.*

A. (Polystichum) Lonchitis—Pol-ys′-tich-um ; Lonch-i′-tis (spear-like), *Swartz.*

This very handsome species, generally known under the popular name of "Holly Fern," but which sometimes is also called the "Alpine Shield Fern," is of very cosmopolitan character. Though usually accepted as a plant of true British origin, it is so extensively distributed as to be considered native of almost all parts of the globe. In Europe it also occurs in Iceland, Lapland, Sweden, Denmark, Russia, Germany, Hungary, France, Switzerland, Italy, and Spain. In India it is abundant on the Himalayas. In North America, where it is also known under the name of Holly Fern, *A. Lonchitis*, according to Eaton, is found in rocky places from the vicinity of Georgian Bay, Lake Huron, Canada, to the southern shore of Lake Superior, and westward to the Cascade Mountains of British Columbia.

Considered as a native species, the Holly Fern is found in mountainous districts in the north of the British Islands, where its favourite haunts are the clefts of rocks near the mountain-tops. It was not known as a British plant when, in 1670, Ray published his "Catalogus Plantarum Angliæ," nor even when his "Historia Plantarum" issued from the press in 1686 ; but we find it mentioned in the second edition of his "Synopsis Stirpium Britannicarum" as having been discovered by Mr. Lloyd. As we have before stated, he adopted the name of *Lonchitis aspera major* (larger, rough Spleenwort, with indented leaves), and says that "it issues from clefts in the rocks on the tops of the mountains of Wales, as at Clogwyn-y-Garnedh-y-Grib-Goch-

Trigvylchan (D. Lhwyd)." It has been found in England, near Settle, in Yorkshire; on Swarth Fell, near Ulleswater, and in other parts of Cumberland; on Snowdon and also on Glyder, near Llanberis, in Wales; in Ireland on Bandon Mountains, in a glen east of Lough Eske, Donegal, and on Glenade Mountain, Leitrim. It is in Scotland, however, that the plant is most abundant, being common in the Highland valleys and on exposed mountain sides—on the Breadalbane Mountains, Perthshire, at an elevation of about 3000ft.; on Clova Mountains and in Glen Isla, Forfarshire; on Ben Lawers and Falcon Clints, near Chaldron Spout, Teesdale; also on Ben Lomond, in Sutherland, in Aberdeenshire, &c.

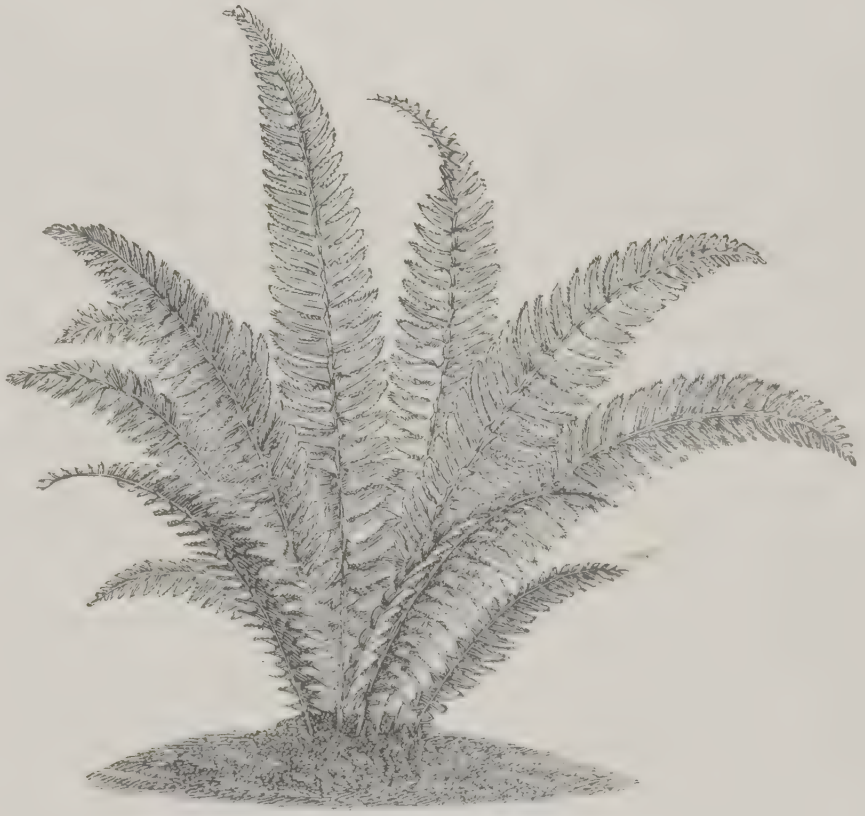


Fig. 68. Aspidium Lonchitis (reduced).

A. Lonchitis, as found in all the above-mentioned places, has a thick and almost woody rootstock densely covered with the imbricated (overlapping) bases of former stalks. The newer portion is of a very chaffy nature, being thickly clothed with large, egg-shaped scales of a peculiar rusty-brown colour. Its fronds, which are stiff and of a leathery texture, of a smooth and shiny nature, and very dark green in colour, are disposed in a regular, shuttlecock fashion at the top of the rootstock (Fig. 68), are borne on scaly stalks 1in. to 4in. long, vary in length from a few inches to 1½ft., and are from 1in. to 2in. broad; they are narrowly spear-shaped, their greatest width being above their middle, so that they are gradually narrowed downwards for more than half their length. The pinnæ (leaflets), about ¾in. long by ¼in. broad, are closely set, and so numerous that on a frond of average size as many as forty of them may be found on each side of the midrib. The lower ones are triangular, having the upper and lower sides nearly equal and slightly eared. Higher up the frond the leaflets become longer, the inferior ear disappears, and the pinnæ curve strongly upwards. Their edges are provided with large, pointed teeth. The sori (spore masses), which are confined to the upper part of the frond, are usually disposed in a single row on each side of the midvein, and half-way between it and the margin.—*Hooker*, *Species Filicum*, iv., p. 8. *Nicholson*, *Dictionary of Gardening*, i., p. 126. *Eaton*, *Ferns of North America*, i., t. 22. *Lowe*, *Ferns British and Exotic*, vi., t. 22. *Beddome*, *Ferns of British India*, t. 128.

The Holly Fern is somewhat capricious under cultivation, although when established it will thrive in the greenhouse and luxuriate for a time in stove temperature. The best mode of treatment, however, is that advocated by Mr. W. Reeve. He has grown it most successfully in the cool house, where it was constantly shaded and standing upon a cool, damp bottom. He employed a compost of sandy loam and peat in equal parts, with a liberal admixture of sharp sand. It may be cultivated upon the outdoor rockery, but great care is necessary, as it is a very shy plant to establish itself in dry, exposed situations. Mr. Reeve remarks that "a shady part of the rockery must be selected, where it can be kept constantly damp without ever being wet," and that it will not stand stagnant moisture; also that it must be planted firmly in the above-mentioned compost as early in the spring as possible, and that if a hand- or bell-glass can be kept over it for a short time it is all the better, as this will keep the soil moist about it for some time without the application of much water, after which it should be gradually inured to more air. It is usually increased by means of its spores, which should be sown as soon as ripe, for the division of its crowns, when several are produced, is at all times, and even under the most favourable conditions, considered a very risky operation.

Although so widely distributed, *A. Lonchitis* is remarkably free from variations; and, with the exception of Wollaston's variety *multifidum*—in which the extremity of the frond is occasionally divided—and also of his variety *proliferum*, of normal form, but producing small bulbils in the axils of the lowest pinnæ, it may be said that only one really distinct form of this handsome species, viz., *confertum*, is known either in a wild state or under cultivation.

A. L. confertum—con-fer′-tum (full, crowded), *Lowe.*

This variety is known as the Irish form of *A. Lonchitis*, and differs essentially from the species through the smaller size of its equally rigid and upright fronds, which are furnished with more numerous and narrower pinnæ (leaflets), so crowded together that they conspicuously overlap each other. In this form the auricle (ear) existing at the base of each leaflet is hidden by the leaflet immediately above and overlapping it.—*Lowe*, *Our Native Ferns*, i., fig. 43.

A. marginatum—mar-gin-a′-tum (margined). This is a variety of *A. auriculatum.*

A. (Polystichum) melanochlamys — Pol-ys′-tich-um ; mel-an-och′-lam-ys (having a black covering), *Fée.*

A stove species, native of Cuba, with fronds 1½ft. to 2ft. long and 9in. to 12in. broad, borne on tufted, erect stipes (stalks) 6in. to 12in. long and densely covered, especially below, with dark brown scales of a hairy nature. The pinnæ (leaflets), 4in. to 6in. long and 1½in. to 2in. broad, are of a dark green colour, and divided into pinnules (leafits) somewhat sickle-shaped and cut down to the rachis (stalk of the leafy portion of the frond) ; they are of a soft, papery texture, and have both surfaces naked. The sori (spore masses), which are disposed at the base of the pinnules, principally in the lower ones, are provided with a peltate involucre (covering attached to the frond by its centre), which is black in the middle, and has its edge ciliated (furnished with short hairs).—*Hooker*, *Species Filicum*, iv., p. 35, t. 233A.

A. (Polystichum) melanostictum—Pol-ys′-tich-um ; mel-an-os-tic′-tum (having a black dot), *Kunze.*

A stove species, native of Mexico, in general appearance very similar to *A. melanochlamys*, its fronds being of the same dimensions, texture, and colour. The sori (spore masses) show the same peltate involucre (covering fixed to the frond by its centre), which is also quite black ; but in this case they are disposed in two rows extending the full length of the pinnules (leafits) and filling up nearly the whole space between the midrib and the edge.—*Hooker*, *Species Filicum*, iv., p. 34, t. 233B.

A. (Euaspidium) membranaceum—Eu-as-pid′-ĭ-um ; mem-bra-na′-cĕ-um (parchment-like), *Hooker.*

This fair representative of the true Aspidium, of rather large dimensions, is a native of Ceylon, Java, the Philippine Islands, Western China, and Formosa. Its fronds, of a thin, papery texture and pale green colour, 1½ft. to 2ft. long and 1ft. broad, are borne on tufted stipes (stalks) 1ft. long and furnished with only a few spreading, narrow scales below. The lowest pinnæ (leaflets), which are much the largest, are 6in. to 8in. long by 3in. to 4in. broad, and are subdivided into pinnules (leafits) having the appearance of small, oblong, sinuated (uneven) lobes. The copious sori (spore masses), which are covered by an involucre that is peltate (attached to the frond by its centre), are disposed principally on the margins of the lobes.—*Hooker, Species Filicum*, v., p. 105.

A. (Cyclodium) meniscioides — Cy-clo′-dĭ-um ; me-nis-cĭ-ŏ-i′-des (Menisicum-like), *Willdenow.*

A stove species, native of the West Indies, Brazil, and Peru. Its fronds are simply pinnate (once only divided to their midrib), 2ft. to 3ft. long and 1ft. or more broad, and are borne on stipes (stalks) 1ft. to 2ft. long and scaly below. The barren leaflets, which are sessile (stalkless), measure from 6in. to 9in. in length and 1½in. to 2in. in breadth, while the fertile ones are much smaller. Both are of a coriaceous (leathery) texture and naked on both surfaces. The sori (spore masses) are disposed in two close rows between the main veins. This species is also known as *A. confertum.*—*Hooker, Species Filicum*, iv., p. 36. *Nicholson, Dictionary of Gardening*, i., p. 127.

A. (Polystichum) mohrioides—Pol-ys′-tich-um ; moh-rĭ-ŏ-i′-des (Mohria-like), *Bory.*

This singular and pretty, greenhouse Fern, which has the appearance of a stout but reduced form of *A. aculeatum lobatum*, less the sharp-pointed, spiny teeth of its leaflets, has a very wide range of habitat, for it was first known as a native of Patagonia and the Cordilleras of Chili ; later on it was gathered on Marion Island by Mr. Moseley, the botanist attached to the "Challenger" expedition. In North America, where it is commonly called the "Falkland Islands Shield Fern," *A. mohrioides* is found on the mountains of Northern California at an elevation of 8000ft., in which locality it was first discovered by the botanists of the "Duperry's" voyage, and later on by Darwin, J. D. Hooker, and others. We have it on the authority of Eaton that in North America this Fern grows in loose and moist granitic soil; the rootstocks, which are very chaffy with dark brown scales, are hidden under rocks, and a great many plants are found in one cluster. Mr. J. G. Lemmon, from whom Eaton derives his information, says: "It is very abundant on the side of a little valley at the headwaters of the South Fork of the Sacramento, and along the southern sloping side of Mount Eddy, which rises on the northern side of the valley." Its fronds, of a thick, leathery texture, oblong-spear-shaped in form, 6in. to 12in. long and 2in. to 3in. broad, are borne on stout stipes (stalks) 2in. to 6in. long, more or less densely clothed with spear-shaped scales of a dark brown colour; they are furnished with numerous lanceolate pinnæ (spear-shaped leaflets), bluntly toothed or slightly three-lobed in small plants, but cut down to the midrib into slightly-toothed leafits in full-grown plants. The sori (spore masses) are abundant on the superior pinnæ, and are placed mostly near the midveins of the lobes; they are covered by round involucres centrally affixed in the middle of each sorus to the back of the fertile vein.—*Eaton*, *Ferns of North America*, ii., t. 80. *Hooker*, *Species Filicum*, iv., p. 26. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. (**Polystichum**) **mucronatum**—Pol-ys′-tich-um; mu-cro-na′-tum (sharp-pointed), *Swartz.*

This lovely, dwarf, close-growing, evergreen, easily-cultivated, stove species is a native of Jamaica, and through the coriaceous (leathery) texture of its fronds, their dark colour, and their stiff habit, somewhat resembles our Holly Fern (*A. Lonchitis*), though more graceful in habit (Fig. 69). Its elegantly-cut fronds, 1ft. to 1½ft. long and 1½in. to 2in. broad, are borne on erect stalks 2in. to 4in. long, densely clothed with large, spear-shaped scales of a reddish-brown colour. They are simply pinnate (once only divided to the midrib), and furnished with numerous shortly petiolate (stalked), unequal-sided, sharp-pointed pinnæ (leaflets), the edges of which are either entire or slightly lobed, according to the vigour of the plant. These pinnæ, which are distinctly auricled (eared) at the base on the upper side and wedge-shaped at their inferior base, are so closely set as to be frequently imbricated (overlapping). The bold and prominent sori (spore masses) are disposed in a long row on each side of the midrib.

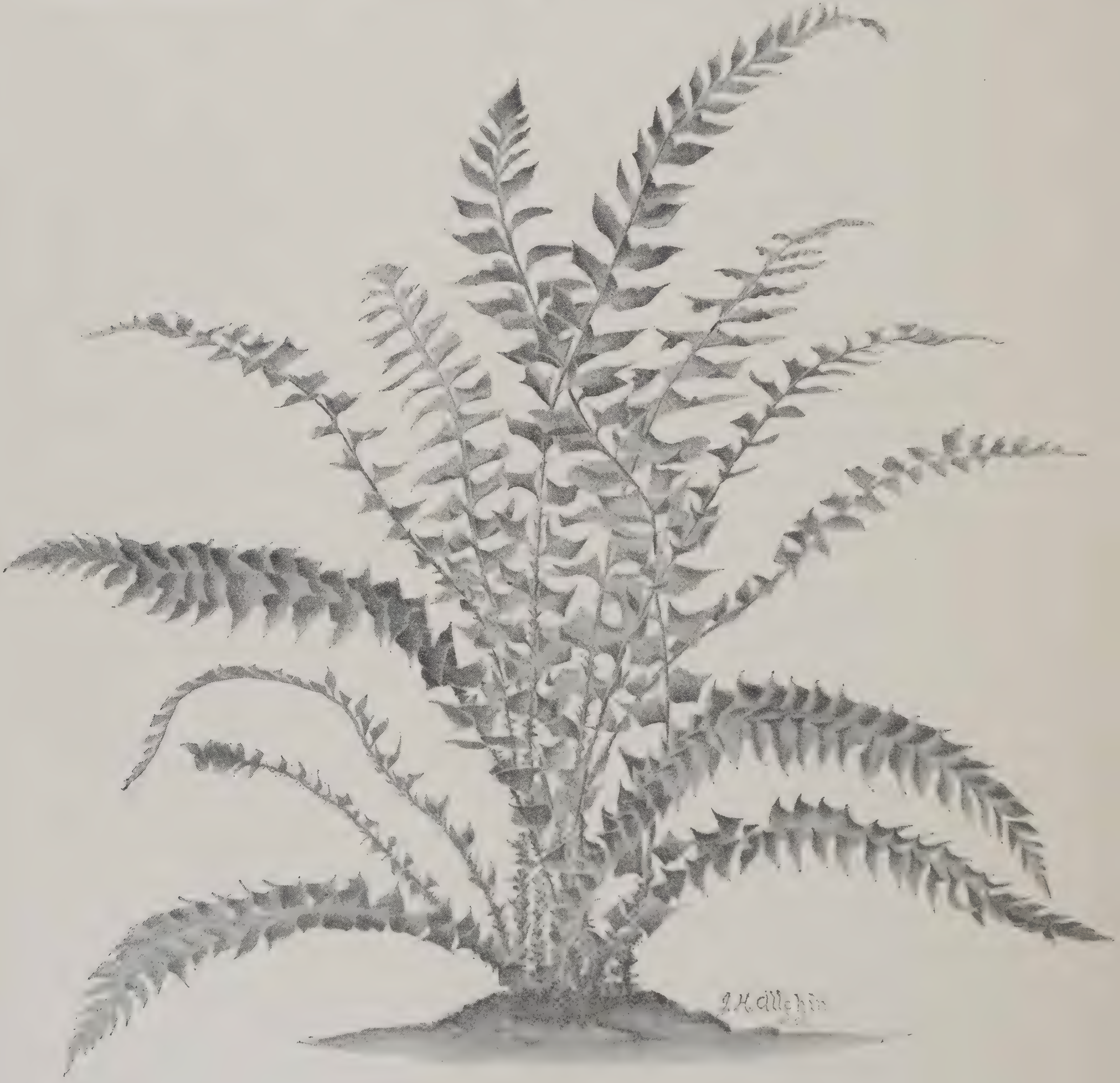


Fig. 69. Aspidium mucronatum
(⅓ nat. size).

—*Hooker*, *Species Filicum*, iv., p. 9, t. 216. *Lowe*, *Ferns British and Exotic*, vi., t. 31. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. (Polystichum) multifidum — Pol-ys′-tich-um ; mul-tif′-id-um (many times cleft), *Mettenius.*

A greenhouse species, native of Chili, with fronds 1ft. to 2ft. long, 6in. to 9in. broad, borne on slender stalks 6in. to 12in. long and densely clothed with large, egg-shaped, nearly black scales. The close and spreading pinnæ (leaflets) are from 3in. to 4in. long and about 1in. broad ; they are divided into unequal-sided pinnules (leafits) of a somewhat leathery texture, which in their turn are subdivided into ovate (egg-shaped) or spathulate (spoon-shaped) segments, the lower ones being again deeply pinnatifid (cut down nearly to their midrib), but with blunt teeth. The small and numerous sori (spore masses) are scattered over the whole of the under-surface of the fertile pinnules.—*Hooker*, *Species Filicum*, iv., p. 35.

A. (Polystichum) munitum—Pol-ys′-tich-um ; mu-ni′-tum (armed), *Kaulfuss.*

This very handsome, greenhouse species is, when well grown and fully developed, one of the finest Ferns native of North America, where it is popularly known under the name of "Chamisso's Shield Fern." It is found amongst rocks and in forests, sometimes very abundantly, from Guadalupe Island and San Diego, California, northward to British Columbia, but is unknown east of the Sierra. The finest specimens, according to Eaton, are found in Mendocino County, California, and in Southern Oregon. The handsome, spear-shaped fronds (Fig. 70), of evergreen nature and leathery texture, bright shining green above and paler beneath, according to the same authority, measure in a wild state from 1ft. to 5ft. in length, varying with the strength of the plant and the nature of the climate and soil where it occurs. Under cultivation, however, they seldom exceed 2ft. in length and 8in. in breadth, and are borne on tufted, straw-coloured stipes (stalks) 4in. to 9in. long, densely clothed, especially below, with large, glossy, spear-shaped scales of a light brown colour, ciliated (hairy) all round, and growing gradually smaller upwards. The pinnæ (leaflets), which are very numerous (from thirty to forty on each side of the midrib), are from 3in. to 4in. long, ½in. broad, and closely set ; they are nearly straight, and their margin is finely but sharply serrated (dented like a saw) with oblique or incurved teeth. The large and conspicuous sori (spore masses) are disposed in two rows near the edge, and are provided with an orbicular indusium (round covering), which, as usual, is attached to the frond by its centre.—*Hooker*, *Species Filicum*, iv., p. 10, t. 219. *Eaton*, *Ferns of North America*, i., t. 25. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

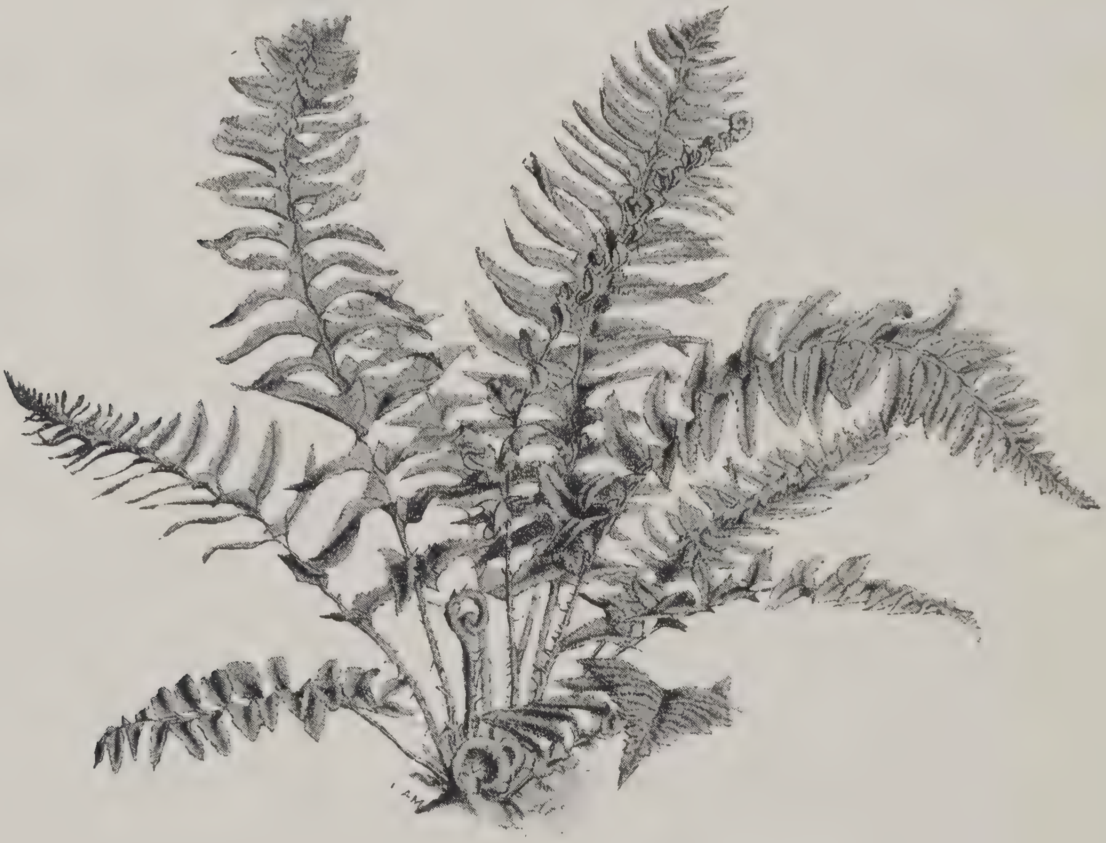


Fig. 70. Aspidium munitum
(reduced).

A. nephrodioides—neph-ro-dĭ-ŏ-i′-des (Nephrodium-like). Synonymous with *A. Hookeri*.

A. (Euaspidium) nicaraguense—Eu-as-pid′-ĭ-um ; ni-ca-ra-guen′-sĕ (from Nicaragua), *Baker*.

This singular, stove species, of comparatively small dimensions, is of dimorphous nature ; that is to say, its fronds assume different shapes according to their being sterile or fertile. The sterile ones are oblong-spear-shaped, entire (undivided), 6in. to 9in. long and 2½in. to 3in. broad, and end in a long, tapering point, but are rounded or heart-shaped at the base ; they are of a firm, parchment-like texture and bright green on both surfaces, and are borne on stipes (stalks) 4in. to 6in. long and furnished with a few spear-shaped scales at the base. The fertile fronds are smaller, and are borne on longer stalks. The sori (spore masses) are disposed in rows close to the main veins, six to ten between the midrib and the edge.—*Hooker, Synopsis Filicum*, p. 493.

A. obliquum—ob-li′-qŭ-um (oblique). A variety of *A. auriculatum.*

A. (Polystichum) obtusum — Pol-ys′-tich-um ; ob-tu′-sum (blunt), *Mettenius.*

A stove species, native of Luzon, and one which in general appearance somewhat resembles a diminutive form of *A. aculeatum.* Its fronds, 1ft. or more long and 4in. to 6in. broad, are borne on stalks 4in. to 6in. long and densely clothed with large, bright brown scales ; they are spear-shaped and furnished with numerous pinnæ (leaflets) of a leathery texture. The lower leaflets are 3in. to 4in. long and ¾in. broad, and are divided into distinct pinnules (leafits) furnished with blunt teeth. The sori (spore masses) are disposed in two rows half-way between the midrib and the edge.—*Hooker, Species Filicum*, iv., p. 24, t. 221.

A. ocellatum—oc-el-la′-tum (spotted). Synonymous with *A. auriculatum.*

A. (Polystichum) oculatum — Pol-ys′-tich-um ; oc-ul-a′-tum (having eyes), *Hooker.*

This greenhouse species, of medium dimensions, is a native of New Zealand. Its fronds, 1ft. or more long and 4in. to 6in. broad, are borne on firm, straw-coloured stalks about 1ft. long, clothed throughout with lanceolate (spear-shaped) scales of a dark brown colour. The pinnæ (leaflets) on each side of the midrib are numerous, 3in. to 4in. long by 1½in. broad, and of a leathery texture ; they are subdivided into spear-shaped pinnules (leafits), cut down nearly to the rachis (midrib) into oblong segments. The sori (spore masses) are disposed in two rows near the midrib.—*Hooker, Species Filicum*, iv., p. 24, t. 228.

A. Padleyanum—Pad-ley-a′-num (Padley's). A variety of *A. angulare proliferum.*

A. parvissimum—par-vis′-sim-um (very small). A variety of *A. angulare.*

A. (Polystichum) Plaschnikianum—Pol-ys′-tich-um ; Plasch-nik-ĭ-a′-num (Plaschnik's), *Kunze.*

A stove species, of small dimensions, native of Jamaica. Its fronds are nearly entire or slightly lobed at the base, and are seldom more than 6in. in length and ¾in. in breadth ; they are borne on tufted, slender stipes (stalks), scaly below, are of a coriaceous (leathery) texture, slightly scaly on both surfaces, and possess the peculiarity of rooting at the point. The numerous sori (spore masses) are scattered over the whole of the under-surface of the frond.—*Hooker*, *Species Filicum*, iv., p. 7, t. 211.

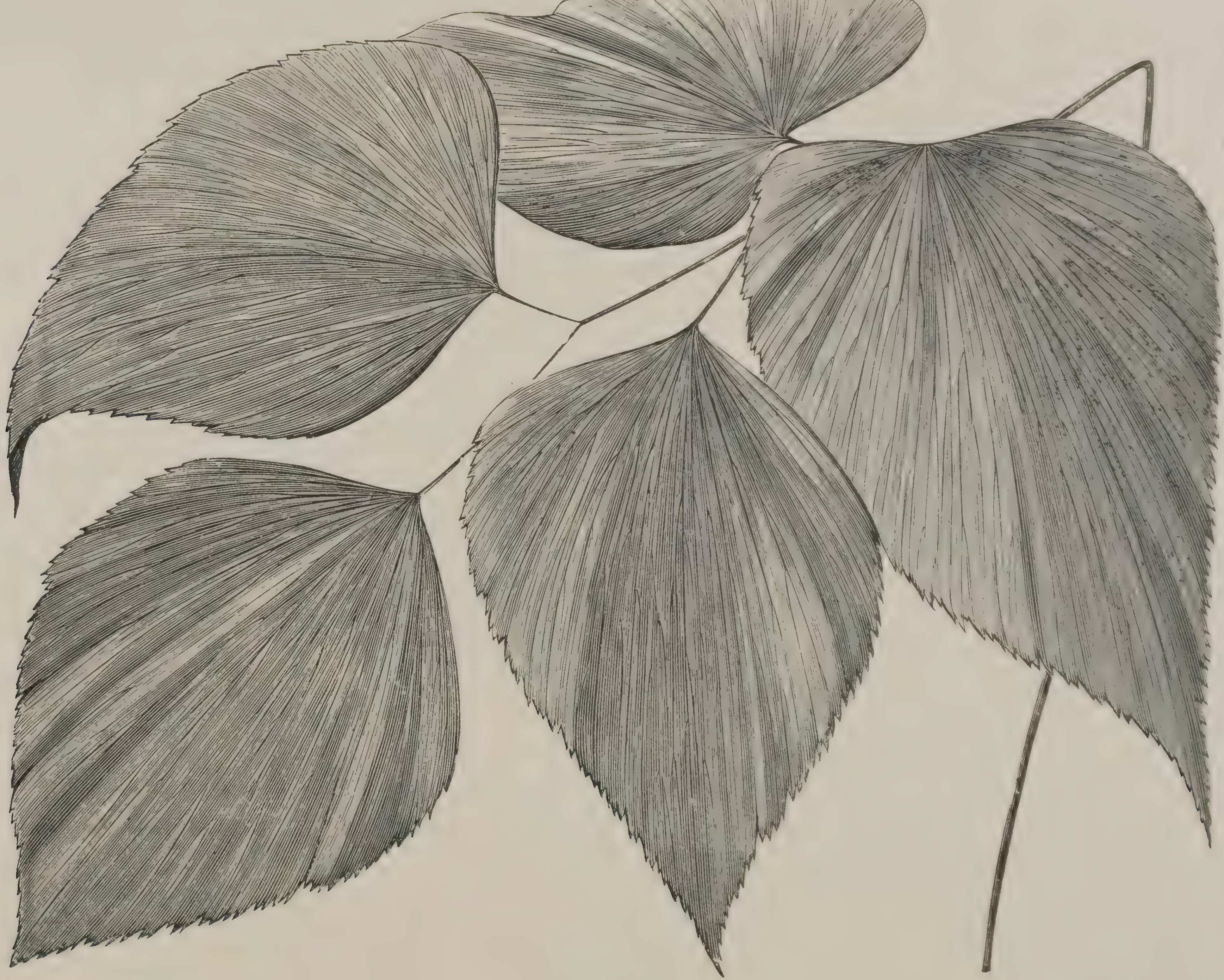
A. (Euaspidium) platanifolium—Eu-as-pid′-ĭ-um ; plat-an-if-ol′-ĭ-um (Platanus- or Plane-tree-leaved), *Mettenius.*

This stove species, of very singular appearance, native of the Malayan Islands, is essentially distinct through the shape of its fronds, which are borne on dark, glossy, smooth stalks 6in. to 10in. long. Their leafy portion, 6in. to 9in. each way, is heart-shaped, but palmately divided into three or five lobes ; the terminal division ends in a long, tapering point ; the lateral lobes are of similar shape but of smaller dimensions, the basal ones frequently being blunt ; they are of a thin, papery texture. The small and very abundant sori (spore masses) are scattered over the whole of the under-surface of the frond.—*Hooker*, *Species Filicum*, iv., p. 44.

A. plumosum—plu-mo′-sum (feathery). A name applied to varieties of *A. aculeatum* and *A. angulare.*

A. (Polystichum) Prescottianum—Pol-ys′-tich-um ; Pres-cot-tĭ-a′-num (Prescott's), *Hooker.*

This greenhouse species, native of Northern India, Kumaon, and Bhotan—where, according to Beddome, it is found at an elevation varying between 10,000ft. and 12,000ft.—is easily distinguished from all the other known Himalayan forms by its long, narrow, finely-cut, flaccid fronds, borne on tufted stipes (stalks) 1in. to 4in. long and clothed with large, spear-shaped scales of a light brown colour. These fronds, 1ft. to 1½ft. long by 3in. broad, of a somewhat leathery texture and pale green colour, are furnished with numerous spreading pinnæ (leaflets) 1½in. long and ½in. broad, cut down to the rachis (stalk of the leafy portion) into several somewhat oblong pinnules



Upper Half of Frond of Adiantum Seemannii
(nat. size).

(leafits) provided with aristate (awned) teeth. The weak, straw-coloured rachis (stalk of the leafy portion of the frond) is densely scaly throughout. The sori (spore masses) fill up nearly the whole breadth of the pinnules between the edge and the midrib. Fig. 71 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, iv., p. 22, t. 223. *Beddome*, *Ferns of British India*, t. 34.

A. proliferum—pro-lif′-er-um (bulbil-bearing), *Brown.*

An Australian form of *A. aculeatum*, bearing one or sometimes two young plants at the end of its fronds. This name is also applied to a variety of *A. angulare.*

A. pumilum—pu′-mil-um (small). A variety of *A. angulare.*

A. (Polystichum) pungens—Pol-ys′-tich-um ; pun′-gens (pricking), *Kaulfuss.*

This very pretty, greenhouse species, native of the Cape Colony and Natal, is distinguished from all other kinds closely allied to *A. aculeatum* principally by the wide-creeping nature of the underground rhizome (prostrate stem), from which its somewhat leathery fronds, 2ft. to 3ft. long by 9in. to 10in. broad, and borne on slightly scaly stalks 1ft. long, are abundantly produced. The fronds are spear-shaped, bipinnate (twice divided to the midrib), and furnished with numerous pinnæ (leaflets) set somewhat far apart and subdivided into pinnules (leafits) that are deeply toothed and show on their edge numerous teeth of a stiff, awned nature. The sori (spore masses) are disposed principally in two rows and nearer the midrib than the edge. This species is proliferous, being usually provided at the end of its fronds with a solitary bulbil that develops into a perfect plant.—*Hooker*, *Synopsis Filicum*, p. 252. *Nicholson*, *Dictionary of Gardening*, i., p. 127. *Lowe*, *Ferns British and Exotic*, vi., t. 8.

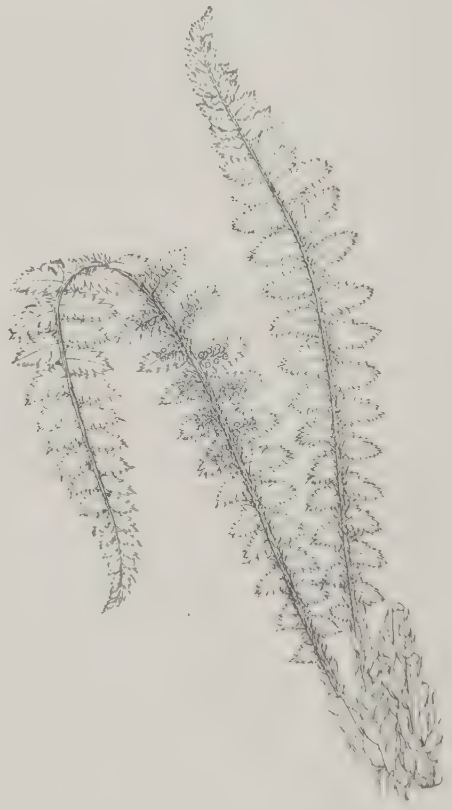


Fig. 71. Aspidium Prescottianum (¼ nat. size).

A. (Euaspidium) repandum—Eu-as-pid′-ĭ-um ; rep-an′-dum (wavy-leaved), *Willdenow.*

A strong-growing, stove species, native of the Philippine Islands. The fronds are 2ft. or more long and 1ft. to 1½ft. broad, and are borne on stipes (stalks) 1ft. to 2ft. long ; they are deeply pinnatifid (cut down nearly to the midrib) at their summit and show slightly sinuated (wavy) lobes ; below this there are four to eight pinnæ (leaflets) on each side, and these are 6in. to 8in. long and about 1½in. broad, terminating in a tapering point and narrowed below, with their edge bluntly waved. The sori (spore masses) are disposed in two distinct rows near the main vein.—*Hooker*, *Synopsis Filicum*, p. 259. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. (Polystichum) rhizophyllum — Pol-ys′-tich-um ; rhi-zoph-yl′-lum (frond-rooting), *Swartz.*

A very small-growing species, native of Jamaica and Cuba. Its little fronds, 2in. to 6in. long and ¾in. broad, and borne on slender, tufted stalks 1in. to 2in. long, have their narrow upper half lengthened out and usually rooting at the extremity ; their lower half is cut down to the flattened rachis (stalk of the leafy portion) into nearly entire lobes of a somewhat leathery texture. The sori (spore masses) are scattered over the whole under-surface of the fertile leaflets. — *Hooker*, *Species Filicum*, iv., p. 7. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. (Polystichum) Richardi—Pol-ys′-tich-um ; Rich-ard′-i (Richard's), *Hooker.*

A greenhouse species, native of New Zealand, of medium dimensions and differing from *A. aculeatum* by its more rigid texture and shorter teeth, and by its lower pinnæ (leaflets) being of the same size as those of the centre of the frond. Its fronds are of a coriaceous (leathery) texture, 9in. to 18in. long and 6in. to 9in. broad, and are borne on stout, erect stalks 6in. to 12in. long and scaly throughout. The sori (spore masses) are disposed in two rows midway between the midrib and the edge. — *Hooker*, *Species Filicum*, iv., p. 23, t. 222.

A. rotundatum—rot-un-da′-tum (rounded). A variety of *A. angulare.*

A. (Polystichum) Seemanni—Pol-ys′-tich-um ; See-man′-ni (Seemann's), *Hooker.*

This stove species, native of Panama, has fronds 1½ft. to 2ft. long by 1ft. broad, borne on stout, upright stipes (stalks) that are scaly only at their base. The pinnæ (leaflets), of a leathery texture, 6in. to 8in. long and 2in. to 2½in. broad, are subdivided into unequal-sided pinnules (leafits), bluntly lobed and nearly naked on both surfaces. The lower lobes reach down nearly to the rachis (stalk of the leafy portion); their midrib is very prominent, and the sori (spore masses) are disposed from four to six to each lobe.—*Hooker*, *Species Filicum*, iv., p. 34, t. 230.

A. (Cyclopeltis) semicordatum — Cy-clop-el′-tis ; se-mic-or-da′-tum (half-heart-shaped), *Swartz.*

This very uncommon and equally interesting, stove species is a native of Tropical America, where it has a very wide range of habitat, being found in a wild state from Cuba and Panama to Brazil and Peru ; also in Moulmein, where, according to Beddome, it was found by the Rev. C. S. Parish. Its fronds, which are produced from a short, stout, and scaly rhizome (prostrate stem), are 2ft. to 3ft. long, 8in. to 12in. broad, and simply pinnate (once only divided to the midrib) ; they are borne on stalks 6in. to 10in. long, and are furnished with spreading pinnæ (leaflets) which are nearly entire, stalkless, and almost heart-shaped or auricled (eared) at the base, where they are jointed to the rachis (stalk of the leafy portion) ; the pinnæ are of a soft, papery texture and bright green colour. The sori (spore masses) are disposed in one, two, or three rows on each side of the midvein, the inner one, the most constant and regular, close to it.—*Hooker*, *Species Filicum*, iv., p. 16. *Nicholson*, *Dictionary of Gardening*, i., p. 127. *Lowe*, *Ferns British and Exotic*, vi., t. 3. *Beddome*, *Ferns of British India*, t. 35.

A. (Lastrea) setosum—Las′-tre-a ; se-to′-sum (bristly), *Blume.* A stove species, native of Java, and now classed under *Nephrodium.*

A. (Polystichum) setosum — Pol-ys′-tich-um ; se-to′-sum (bristly), *of commerce.*

Although we fail to find any authority answerable for its name, this splendid greenhouse Fern, of Japanese origin, has, through its lasting qualities, become one of the most popular kinds grown for decorative purposes. Its general aspect is somewhat similar to that of our *A.* (*Polystichum*) *angulare*, but its evergreen fronds, 1¼ft. to 1½ft. long and 4in. to 6in. broad, are borne on stiff stalks 8in. to 10in. long and of a very scaly nature (Fig. 72). These fronds are densely furnished with leaflets of a leathery texture and dark shining green colour, and are subdivided into pinnules (leafits) that are somewhat heart-shaped but terminate in a sharp seta (bristle), and so closely set as to be in some cases quite overlapping. The abundant sori (spore masses) are scattered over the whole of the under-surface of the pinnules. This plant proves perfectly hardy in sheltered positions in the West and South of England.

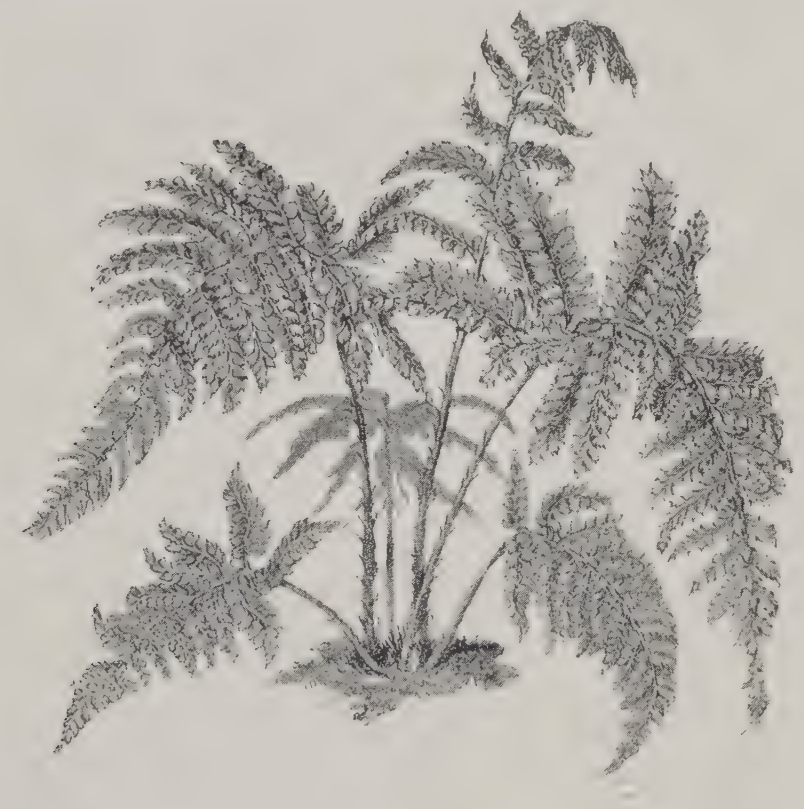


Fig. 72. Aspidium setosum
(⅛ nat. size).

A. (Polystichum) sikkimense—Pol-ys′-tich-um ; sik-kim-en′-sĕ (from Sikkim), *Baker.*

A greenhouse species, native of Mon-Lepcha, where it is found at an elevation of 10,000ft. to 11,000ft. Its fronds, 2ft. to 3ft. long and about 1ft. broad, of soft texture and smooth on both sides, are borne on stout stalks 1ft. to 1½ft. long, and are clothed throughout with egg-shaped scales of a dark brown colour. The spear-shaped and spreading pinnæ (leaflets), of a thin, papery texture, are closely set, and the lowest are 6in. to 8in. long and 2in. broad ; they are subdivided into unequal-sided pinnules (leafits), cut down nearly to the rachis (stalk of the leafy portion) which is slightly scaly throughout, into oblong lobes that are pinnatifid (divided half-way to the midrib) and furnished with sharp teeth. The sori (spore masses) are usually disposed one on the base of each lobe.—*Hooker*, *Synopsis Filicum*, p. 256. *Beddome*, *Ferns of British India*, t. 127.

A. squarrosum—squar-ro′-sum (rough), *Don.*

This plant, also known as *A. rufo-barbatum* of Wallich, is a form of *A. aculeatum*, having the rachis (stalk of the leafy portion) densely covered with reddish-brown scales.

A. (Polystichum) Thomsoni—Pol-ys′-tich-um ; Thom′-s-oni (Thomson's), *Hooker.*

A greenhouse species, of small dimensions, native of the Himalayas, where it is found at elevations varying between 7000ft. and 13,000ft. Its fronds, 6in. to 8in. long and barely 1in. broad, are borne on slender, straw-coloured stalks 2in. to 4in. long and scaly. The pinnæ (leaflets) are ½in. long, ¼in. broad, and unequal-sided, the lower side the smaller, and obliquely truncate at the base ; they are of a somewhat leathery texture, and their lobes are furnished with sharp teeth. The sori (spore masses) are mostly disposed one to each lobe.—*Hooker*, *Species Filicum*, iv., p. 7. *Beddome*, *Ferns of British India*, t. 126.

A. trapezioides — trap-e-zĭ-ŏ-i′-des (trapezium-like). Synonymous with *A. viviparum.*

A. triangulare laxum—trĭ-ang-ul-a′-rĕ lax′-um (triangular, loose).

A garden name for a Fern with elegant, long, and very narrow fronds of a particularly drooping character, possibly a pendulous form of *A. ilicifolium ;* it is useful for decoration on account of its leathery texture and of the lasting quality of its foliage.—*Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. (Polystichum) triangulum — Pol-ys′-tich-um ; trĭ-ang′-ul-um (triangular), *Swartz.*

A stove species, native of the West Indies. Its fronds are 1ft. or more long and 1½in. to 2in. broad, and are borne on stalks 2in. to 6in. long, with large, dark brown scales at the base. The numerous pinnæ (leaflets), of a leathery texture, are sessile (stalkless) and sharply pointed, and their edges, which are nearly entire or slightly lobed, are furnished with blunt teeth ; the base is auricled (eared) on one or sometimes both sides. The spore masses are principally disposed in two rows near the edge.—*Hooker*, *Species Filicum*, iv., p. 14. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. t. ilicifolium—i-lic-if-ol′-ĭ-um (Holly-leaved), *Don.*

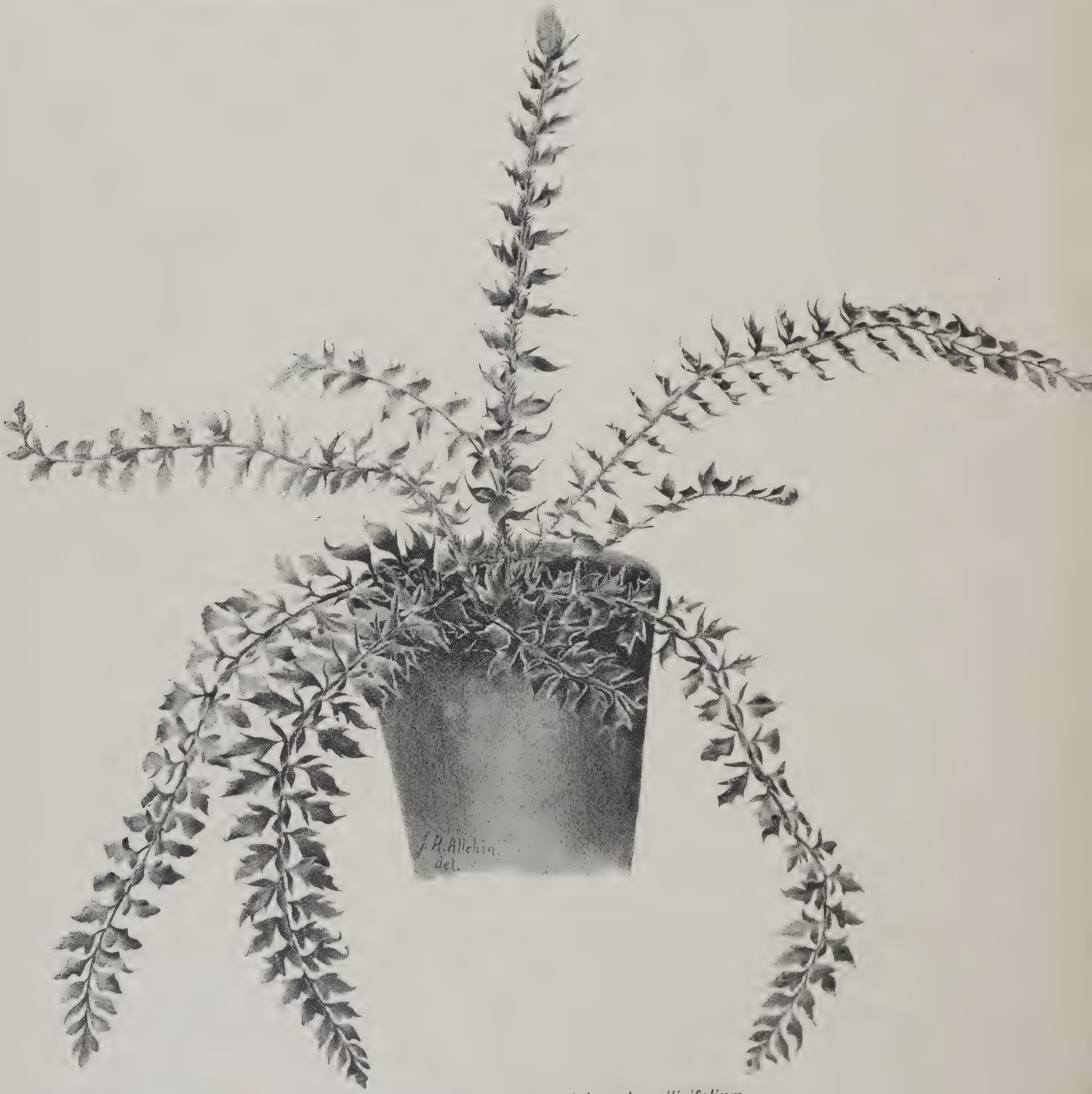


Fig. 73. Aspidium triangulum ilicifolium
(⅓ nat. size).

A greenhouse variety, native of Northern India, where it is found at an elevation of about 9000ft. Its fronds, 6in. to 9in. long and 1in. to 2in. broad, are borne on slender stalks 1in. to 2in. long, clothed throughout with large scales of a light brown colour. The pinnæ (leaflets) are about 1in. long, mucronate (abruptly pointed) at their extremity (Fig. 73), and cut down below to the stalk into spear-shaped or sharp-pointed, narrow lobes of a leathery texture. The sori (spore masses) are disposed principally in two rows near the midrib.—*Hooker*, *Species Filicum*, iv., p. 12, t. 214.

A. (**Euaspidium**) **trifoliatum**—Eu-as-pid′-ĭ-um ; trif-ol-ĭ-a′-tum (three-leaved), *Swartz.*

This stove species, native of the West Indies and Tropical America, is, when well grown, one of the most conspicuous of all cultivated Ferns. Its bold-looking fronds, 1ft. to 1½ft. long and 6in. to 12in. broad, with a large terminal pinna (leaflet) narrowed or forked at the base, are borne on tufted, brownish, stout stalks 1ft. or more long and scaly only at the base. They also usually have on each side one or two lateral leaflets of a nearly triangular shape, the lowest of which are mostly forked ; these leaflets are of a soft, papery texture and bright green colour ; they are also fertile throughout. The abundant sori (spore masses), disposed in rows near the main veins, are gigantic and conspicuously black.—*Hooker*, *Species Filicum*, iv., p. 45. *Nicholson*, *Dictionary of Gardening*, i., p. 127. *Lowe*, *Ferns British and Exotic*, vi., t. 29.

A. t. heracleifolium—he-rac-le-if-ol′-ĭ-um (Heracleum-leaved), *Willdenow.*

A. trifoliatum is very variable, but this form appears to be the only constant and distinct one known in cultivation. It differs from the species in having its leaflets pinnatifid (divided half-way to the midrib) on both sides at the base.

A. (**Polystichum**) **tripteron** — Pol-ys′-tich-um ; trip′-ter-on (three-winged), *Kunze.*

This greenhouse, or nearly hardy, species, which is one of great elegance and not likely to be confounded with any other, is a native of Japan and Tsus-Sima, where it is found wild on rocky places on sandy hills. It is of medium growth and of a deciduous nature. Its singular fronds (Fig. 74), 1ft. to 1½ft. long, are borne on stipes (stalks) 6in. to 9in. long and densely clothed at the base with large, dark brown scales ; they consist of a large terminal pinna (leaflet) and two lateral ones at their base; these pinnæ are from 4in. to 6in. long, and, like the much longer central or terminal ones, are furnished with closely-set pinnules (leafits) which are very unequal-sided, sharp-pointed at the end, and deeply toothed on the edges. The texture is soft and the colour light green. The very abundant sori (spore masses) are disposed principally in two rows half-way between the midrib and the edge of the fertile pinnules.—*Hooker*, *Species Filicum*, iv., p. 15. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

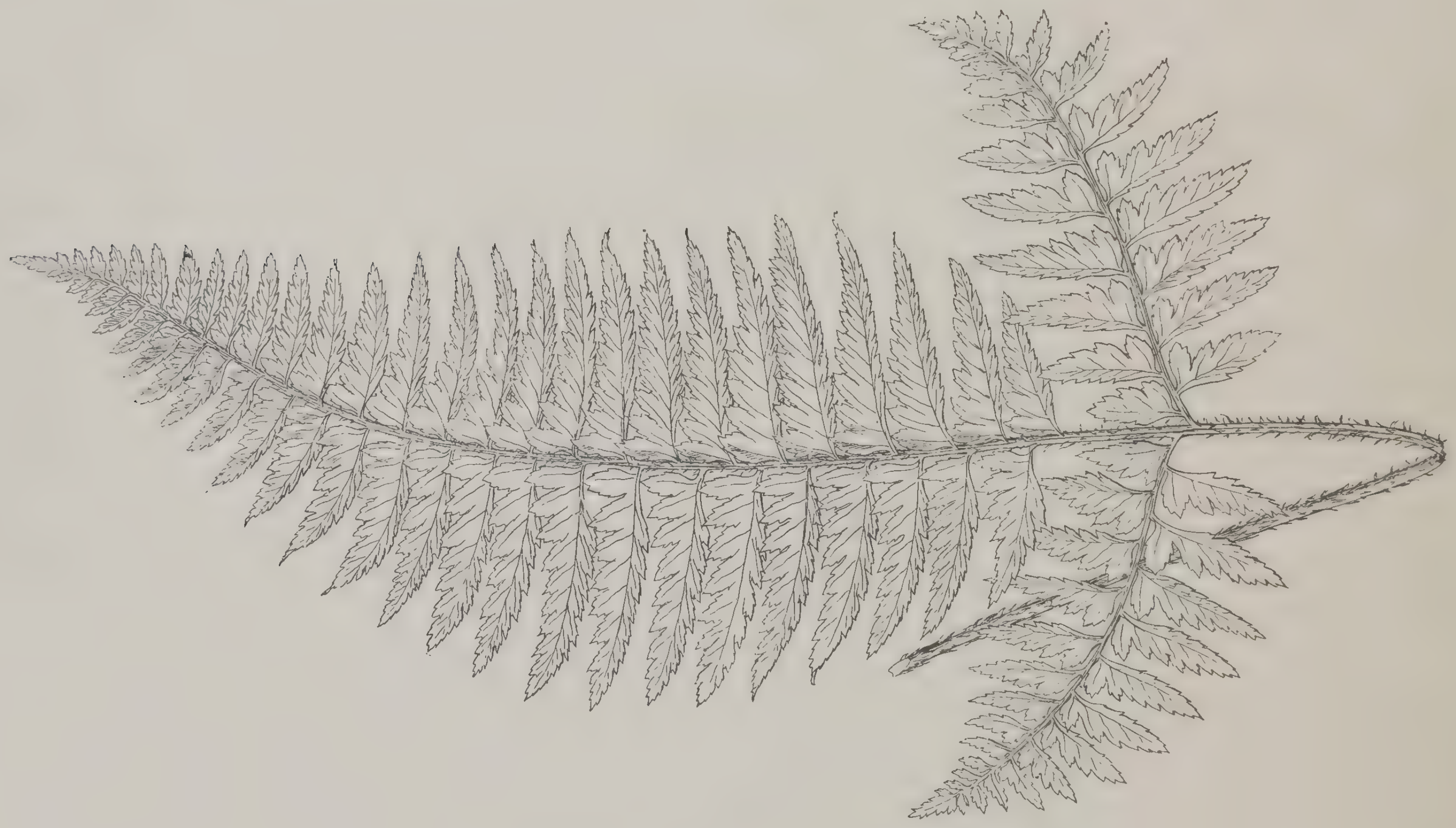


Fig. 74. Frond of Aspidium tripteron
(⅓ nat. size).

A. tsus-simense—tsus–sim-en′-sĕ (from Tsus-Sima), *Hooker*.

This is probably only a slender form of *A. aculeatum*, of a particularly compact habit and dark green colour.

A. (Polystichum) varium—Pol-ys′-tich-um; var′-ĭ-um (variable), *Swartz*.

A greenhouse species, hardy in some favoured localities; it is a native of Japan, and its habit is intermediate between that of a Lastrea and that of a typical Polystichum. The thick, leathery fronds, 1ft. to 1½ft. long and 9in. to 12in. broad, borne on stalks 6in. to 7in. long and densely scaly below, are produced from a decumbent rhizome (prostrate stem) and are of a peculiar metallic tint when young, though when fully developed they are of a rich dark green colour; they are nearly triangular in outline, the lower pinnæ (leaflets) being much the longest. The pinnules (leafits) in all the pinnæ are lanceolate and imbricated (spear-shaped and overlapping), the lowest one on the under-side being much larger than the others; their segments (sub-divisions) are oblong in shape, blunt, and very slightly toothed. The sori (spore masses) are disposed principally in two rows near the midrib.—*Hooker*, *Species Filicum*, iv., p. 30, t. 226. *Nicholson*, *Dictionary of Gardening*, i., p. 126.

A. (Polystichum) vestitum—Pol-ys′-tich-um; ves-ti′-tum (clothed), *Swartz.*

This very handsome, evergreen, greenhouse species, native of New Zealand, Tasmania, and Chili, is of smaller and more compact habit than most of the species belonging to the section *Polystichum*, and it makes a very pretty specimen plant. It must not be confounded with the *Lastrea vestita* of J. Smith, nor with the *Polystichum proliferum* of Presl, the latter of which it somewhat resembles except in being more rigid, in having its fronds much denser, and in not being viviparous (producing young plants) at their extremity. The fronds, which are produced from a tufted rhizome (prostrate stem), are of a particularly dark green colour; they are from 9in. to 12in. long and are borne on stipes (stalks) of similar length, which are densely clothed with bright-coloured scales. These fronds are almost spear-head-shaped and bipinnate (twice divided to the midrib); their oblong, pointed pinnæ (leaflets) are furnished with pinnules (leafits) some of which are auriculate (eared) at the base, while the majority of them are wedge-shaped, with a sharp tooth at their point. The very distinct and conspicuous sori (spore masses) are disposed in one row on each side of the midvein of the fertile pinnules.—*Lowe*, *Ferns British and Exotic*, vi., t. 38.

A. (Polystichum) viviparum—Pol-ys′-tich-um; vi-vip′-ar-um (producing buds), *Fée.*

This stove species, better known under the names of *Polystichum viviparum* and *P. trapezioides*, is a native of the West Indies, and is distinct from nearly all other species on account of its producing at the extremity of the fronds a solitary bud or bulbil from which the plant may be easily propagated. Its very handsome fronds, 1ft. to 1½ft. long and 4in. to 6in. broad, are borne on stipes (stalks) 4in. to 6in. long, covered with large, spear-shaped scales at their base, the lower ones nearly black in the centre. The numerous pinnæ (leaflets) are of a very leathery texture and dark shining green in colour, nearly spear-shaped, the central ones 2in. long and ½in. broad; their edge is more or less deeply lobed. The sori (spore masses) are disposed in two or four rows. For the accompanying Plate we are indebted to Mr. Wm. Bull.—*Hooker*, *Species Filicum*, iv., p. 15. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. Wollastoni—Wol′-las-ton-i (Wollaston's). A variety of *A. angulare proliferum.*

CHAPTER XXVII.

ASPLENIUM, *Linnæus.*

(As-ple′-nĭ-um.)

Spleenwort.

THE name *Asplenium* is derived from *a*, without, and *splen*—the spleen, on account of the supposed property of curing affections of the spleen, with which these plants were formerly credited. The Ferns known as Aspleniums, which in Hooker and Baker's "Synopsis Filicum" are comprised in Genus 38, and which form by far the largest portion of Tribe 8, *Asplenieæ*, are so well marked that it would not be easy to mistake the great majority of them. They differ from most other Ferns by the disposition of their sori (spore masses), which are attached to the veins, and which, instead of being parallel with either the midrib or the margin of the frond, are oblique to the midrib, and are of a peculiar linear-oblong shape. The involucre (covering), which is of the same shape as the sorus, is sometimes single, sometimes double: when single, it opens towards the midrib. It is generally straight, occasionally curved, flat, or tumid, and bursts along its outer edge. The veins are free in a large proportion of the species. The stipes (stalks) of most Aspleniums are of a succulent nature and black, especially on their under-surface, while the leafy portion of the greater part of them is of a soft, fleshy texture.

Asplenium is the second in extent of the genera known to contain British species, including plants from all parts of the world where

Ferns grow, and the variety in shape, size, texture, and cutting of their fronds is very great. In some cases these are simple (undivided), pinnate (once divided to the midrib), bi- or tripinnate (twice or three times divided to the midrib), and as regards size they vary quite as much, for this genus, which is composed mostly of evergreen species, nearly all of easy culture, is represented in all parts of the globe by numerous subjects varying from a few inches in height, as in *A. alternans* and our well-known British *A. Ruta-muraria* and *A. Trichomanes*, to several feet in length, like *A. dimorphum* and *A. longissimum*. The genus is very rich in highly-ornamental plants suitable for decoration, and while some are very distinct and really interesting from a botanical as well as from a commercial point of view, the majority of them make grand specimens for exhibition, and those with long, drooping fronds are, on account of their leathery texture, particularly well adapted for growing in hanging baskets.

The numerous Ferns forming the genus *Asplenium* have been split into many divisions by various authorities, but those retained at present are the following:

ANISOGONIUM (An-is-og-o′-nĭ-um), *Presl*, and CALLIPTERIS (Cal-lip′-ter-is), *Bory*. Veins anastomosing (running into one another), the sori and their involucres extending to both sides of some of them.

ATHYRIUM (Ath-yr′-ĭ-um), *Roth*. In this section, which contains all the species of deciduous (not evergreen) habit comprised in the genus, the veins are free, and the sori and their coverings are more or less curved, and sometimes even horseshoe-shaped.

CETERACH (Ce′-ter-ach), *Willdenow*, and HEMIDICTYUM (He-mid-ic′-tў-um), *Presl*. The plants belonging to this small section have their veins anastomosing towards the margin, and the sori single.

CÆNOPTERIS (Cæn-op′-ter-is), *Bory*, and DAREA (Da′-rĕ-a), *Jussieu*. A section composed of plants with either small, lanceolate (spear-shaped), or ample and finely-divided fronds. In either case the veins are simple and the ultimate divisions of the fronds narrowly linear; the sori, also linear or linear-oblong, are marginal or submarginal (situated upon, or close to, the edge of the fertile pinnules).

DIPLAZIUM (Dip-laz′-ĭ-um), *Swartz*. In this section, which is extensive, some plants have their fronds simple and entire (undivided), or nearly so;

others have theirs linear-spear-shaped, and cut down to the rachis (stalk of the leafy portion) at the base; while the greatest portion of them have their fronds bi- or tripinnate. All have their veins free, and in some of them the sori and involucres extend to both sides.

EUASPLENIUM (Eu-as-ple′-nĭ-um), *Moore.* The plants belonging to this section have their veins free, simple, or branched, and the linear or linear-oblong sori are either straight or discoidal (round or disk-like). This being a very extensive section, it is necessary to enumerate the various groups of which it is composed; all of them are distinct from each other through the divisions of the fronds only.

I.—A group of plants having fronds quite entire, such as *A. ensiforme* of Wallich.

II.—A group with fronds lobed or pinnatifid (cut half-way down to the midrib), as seen in the curious *A. attenuatum* of R. Brown and *A. Hemionitis* of Linnæus.

III.—A group whose fronds are simply pinnate (only once divided to the midrib). This group embraces numerous species, and shows several sub-divisions as follow:

A.—Plants with pinnæ ¼in. to ½in. long, blunt, in most species nearly as broad as long. These are best represented by *A. viride* of Hudson and *A. Trichomanes* of Linnæus.

B.—A small group of plants with few long and narrow pinnæ (leaflets), such as *A. septentrionale* of Hoffmann.

C.—An extensive group of species, with pinnæ numerous, linear or linear-oblong, usually ample, and terminating in a blunt point, such as in *A. caudatum* of Forster and *A. marinum* of Linnæus.

IV.—A group of plants having their fronds bi- to quadripinnate (twice to four times divided to the midrib), such as may be noticed in *A. Ruta-muraria* of Linnæus and *A. cicutarium* of Swartz. It contains most of the species with fronds proliferous on their upper surface.

THAMNOPTERIS (Tham-nop′-ter-is), *Presl*, and NEOTTOPTERIS (Nĕ-ot-top′-ter-is), *J. Smith.* A small section, composed of plants with fronds ample and entire, showing their veins connected at their apex (summit) by a transverse line situated just inside the margin.

Culture.

Aspleniums, as a rule, are not fastidious in their habits; most of them succeed best in a mixture of fibrous loam, peat, and sand, in equal proportions. In potting them, great care should be taken that the drainage is as perfect as possible, as, if it is at all defective, the plants will soon become flabby and begin to show evident symptoms of ill-health. With the exception of a few dwarf species, which grow naturally in walls or in fissures of rocks, Aspleniums, above all, dislike being potted hard. Certainly many of them will stand the full rays of the sun under glass, but although we have seen that mode of culture advocated, and have been able to appreciate its results at their full value, we have failed to find it beneficial in any way to the plants, which, instead of being of a healthy, bright, shining green colour, as nearly all of them are when in good condition, have a yellowish tint, although they may perhaps be hardier than those grown in partial shade. The Aspleniums being native of countries very distant from one another, and being found wild under totally different conditions, it will be easily understood that they require varied treatment, and, on that account, while some kinds really need stove temperature to develop their foliage to perfection, others do well in a greenhouse temperature, while a few of them may even be used with advantage for the ornamentation of the hardy Fernery. Although the majority of the hardier kinds—even our own *A. marinum*—grow very well for a time under the influence of strong artificial heat, it must be borne in mind that it is only a fictitious growth, as those species native of New Zealand, as well as our British kinds, are much more robust, although of slower growth, when kept in a lower temperature.

A considerable number of exotic Aspleniums are either viviparous (with the upper surface of their fronds studded all over with young plants) or at least proliferous at their apex (that is to say, they produce at the extremity of each of their mature fronds either one or a couple of bulbils, which later on develop into young plants). In either case, if there is any desire to increase the stock of any particular viviparous or proliferous species, the portion of the fronds bearing the rudiments of young plants should be fastened down to the soil by means of wooden pegs, and be kept moderately moist, when they will soon root and make plants partaking of all the characters of the specimens from which they were obtained. When these have to be produced in large quantities—such, for instance, as the kinds belonging to the *bulbiferum* group, which for decorative purposes are raised by the thousand—our market growers find it more expeditious to detach the little bulbils when furnished with two or three tiny fronds, and to prick them in close together in shallow boxes filled with a loose compost of three parts of peat or leaf mould, one of loam, and one of sand : in this mixture they produce roots very freely, and rapidly form young plants, which may be potted in single pots as soon as they have from six to eight fronds. None of the British Aspleniums are known to possess these viviparous or proliferous characters, and their propagation is usually effected through the division of their crowns, although they may with advantage be increased from their spores, which mostly ripen in the autumn and germinate freely during the following spring.

It is worthy of special note that all Aspleniums are particularly free from the attacks of such pests as thrips, green fly, and mealy bug, and are naturally clean plants, their worst enemies being woodlice and slugs, which are fond of their succulent stalks.

Principal Species and Varieties.

A. (Euasplenium) abscissum—Eu-as-ple′-nĭ-um ; ab-sciss′-um (clipped), *Willdenow.*

A stove species, of medium dimensions, found from Cuba and Guatemala to Peru and South Brazil. Its fronds, simply pinnate (only once divided to the midrib), 6in. to 12in. long, 3in. to 4in. broad, and borne on stipes (stalks) 4in. to 8in. long and of a greyish colour, are sometimes proliferous (bearing young plants) at their extremity. They are furnished on each side of their midrib with from twelve to twenty sessile pinnæ (stalkless leaflets) ; these are of a thin, papery texture and bright green colour, from 1½in. to 2in. long, and bluntish at their extremity, and their edge is slightly but regularly dented or toothed (Fig. 75). The short sori (spore masses) are abundantly produced, and are disposed in two regular rows, extending neither to the midrib nor to the edge of the pinnæ.—*Hooker, Species Filicum,* iii., p. 134, t. 174. *Nicholson, Dictionary of Gardening,* i., p. 127.

A. (Athyrium) achilleæfolium—Ath-yr′-ĭ-um; ach-ill-e′-æ-fol′-ĭ-um (Achillea-leaved), *Liebmann.*

A greenhouse species, of medium growth, native of Mexico, and remarkable on account of the regularity of the broad wing of the midrib of its pinnæ (leaflets). The fronds, about 2ft. long including the stalks, which are grey and scaly below, are somewhat lanceolate (spear-shaped), and are furnished on each side of the midrib with numerous pinnæ of a peculiarly soft texture; these are 4in. to 6in. long, 1in. broad, and cut throughout to the midrib into numerous bluntly-toothed pinnules (leafits) ½in. long and not more than ⅛in. broad. The sori (spore masses), oblong in shape, are frequently disposed one to each lobe of the pinnules.—*Hooker*, *Species Filicum*, iii., p. 230.

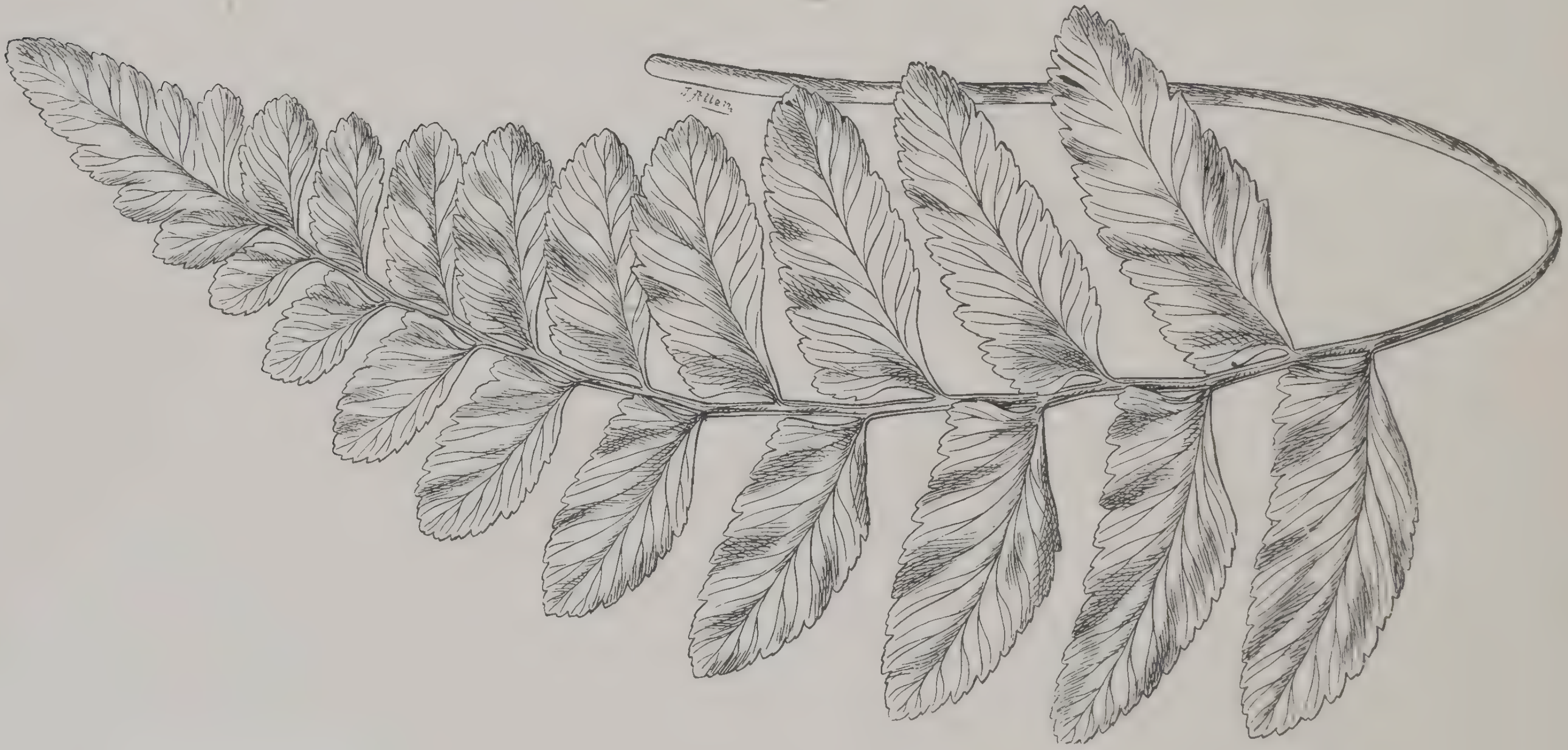


Fig. 75. Frond of Asplenium abscissum
(⅔ nat. size).

A. (Euasplenium) acuminatum—Eu-as-ple′-nĭ-um; ac-u′-min-a′-tum (ending in a long taper-point), *Hooker and Arnott.*

This stove species, which in appearance is intermediate between the popular *A. bulbiferum* and the less-known *A. cuneatum*, is a native of the Sandwich Islands. Its fronds, 1½ft. to 2ft. long and about 1ft. broad, are borne on strong, erect stalks of a peculiar greyish colour. They are provided on each side of their midrib with very numerous and closely-set pinnæ (leaflets), which are oblong-spear-shaped and of a leathery texture, 4in. to 6in. long, 1½in. to 2in. broad, and divided into numerous unequal-sided pinnules (leafits), which end in a long, tapering point. The sori (spore masses) are disposed in two rows in the upper part of the pinnules.—*Hooker*, *Species Filicum*, iii., p. 183, t. 206. *Nicholson*, *Dictionary of Gardening*, i., p. 127.

A. acutum—ac-u′-tum (acute). A very distinct form of *A. Adiantum-nigrum.*

A. (Euasplenium) adiantoides—Eu-as-ple′-nĭ-um; ad-ĭ-ant-ŏ-i′-des (Adiantum-like), *Raddi.*

A stove species, of somewhat large dimensions, native of Jamaica and Brazil, and distinguished in the group of *bulbiferum*, to which it belongs, by its distant and long-stalked pinnæ and pinnules (leaflets and leafits). Its handsome fronds, 1½ft. to 2ft. in length and 8in. to 15in. broad, are borne on firm, naked stalks of a grey colour. They are deltoid (in the shape of the Greek delta, Δ) and quadripinnate (four times divided to the midrib). The lower pinnæ, 6in. to 9in. long and 4in. to 6in. broad, are distant, and are furnished on each side with pinnules borne on comparatively long stalks; these are in their turn subdivided into numerous cuneate (wedge-shaped) divisions. The texture is herbaceous (very soft and succulent), and the abundant sori (spore masses) are linear (disposed in a long and narrow slit). —*Hooker*, *Species Filicum*, iii., p. 186.

A. (Euasplenium) Adiantum-nigrum—Eu-as-ple′-nĭ-um; Ad-ĭ-ant′-um–nig′-rum (Black Maidenhair Spleenwort), *Linnæus.*

This hardy, evergreen species is of quite a cosmopolitan character, for while it is well known as a native Fern in most parts of the British Islands, where it occurs on rocks and on old walls as well as on sandy banks from the sea-level to the altitude of nearly 2000ft., it is also found in quantities almost all over the world. It is plentiful in Northern Europe, in Scandinavia, Russia, and Denmark, as well as in France, Belgium, Germany, and Switzerland, while it is known to grow most luxuriantly under warmer conditions in Spain and Portugal, in Corsica, Madeira, and other places. In Asia it is known to occur in Siberia, Arabia, and Armenia, while at Kashmir, Simla, Java, &c., it is considered as one of the commonest of Indian Ferns.

A. Adiantum-nigrum is one of the British Ferns which first attracted the attention of our botanists, for Ray, in the first volume of his "Historia Plantarum," published in the latter half of the seventeenth century, gives an accurate description of the plant, at the same time stating that "it is found in shadowy places at the roots of trees and shrubs, in shaded fields, and on old walls generally." In those days this Fern was believed to be medicinally valuable in coughs, asthma, and some other diseases, but it is no longer employed even by herbalists.

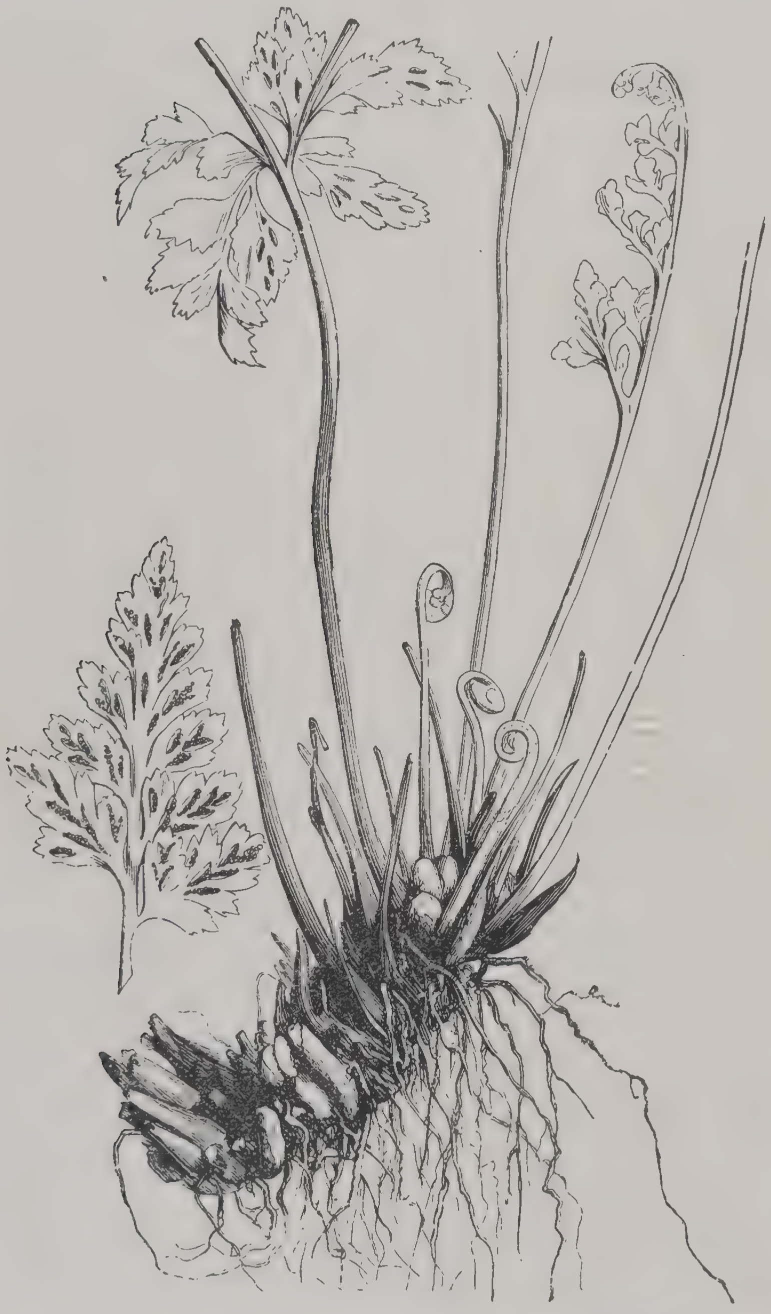


Fig. 76. Asplenium Adiantum-nigrum, showing Rootstock and back of Fertile Frond
(¼ nat. size).

The fronds of *A. Adiantum-nigrum*, 6in. to 12in. long and 4in. to 6in. broad, are borne on chestnut-brown, nearly black, polished stipes (stalks) usually 6in. to 9in. long, but sometimes longer than the leafy portion of the fronds; they usually taper to a long, narrow point, and are of a deep shining green colour above and paler beneath. These fronds are furnished on each side with numerous pinnæ (leaflets) 2in. to 3in. long and 1½in. to 2in. broad, cut down to a compressed, winged rachis (stalk) into numerous pinnules (leafits) which frequently are in their turn cut down into oblong segments sharply toothed round the outer edge, so that according to their state of development or to their size the fronds may be said to be bipinnate, tripinnate, or even subquadripinnate (twice, thrice, or almost four times divided to the midrib). The copious sori (spore masses) appear first in whitish lines varying in number from three to seven on the under-surface of the pinnules (Fig. 76). The whiteness is due to the presence of the thin indusium (covering), which bursts with a smooth edge on the side next the midvein of the pinnule. The covering finally peels off, and then the sori, which are brown, become confluent; that is to say, they spread until they cover the entire back of the pinnule with the exception of the extreme edge all round.—*Hooker*, *Species Filicum*, iii., p. 187. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Beddome*, *Ferns of British India*, t. 62. *Lowe*, *Our Native Ferns*, ii., p. 171, t. 43.

The Aspleniums, or, as they are popularly called, Spleenworts, form a most interesting genus among the Ferns of British origin, and are particularly useful on account of the evergreen nature of their fronds, which characteristic they all possess. The coriaceous (leathery) texture of their foliage also greatly adds to their value as decorative plants; while the ease with which the strongest-growing kinds may be cultivated also tends to make these species particularly popular. Some of the very dwarf-growing sorts are somewhat difficult to preserve, especially in smoky localities, but these, besides succeeding fairly well in Fern-cases, are rendered specially attractive through their constitution and mode of growth, and they may safely be termed the gems among our native Ferns.

On account of the lasting qualities of its foliage, the Black Maidenhair Spleenwort has, within these last few years, taken a prominent position, which it most likely will retain for a long time to come, as its dark, shining fronds, when cut and mixed with flowers, retain their freshness for an almost unlimited time; they are of elegant outline and are produced in great abundance. For some years past, fronds of this plant have been extensively sold and used under the popular denomination of "French Fern," which name has no doubt been erroneously given to it on account of the enormous quantities brought weekly to our markets from the western parts of France, principally from Brittany, where it grows abundantly. It is also found very plentifully in Cornwall, Devonshire, Somerset, Hampshire, and in some other counties, in shady places at the foot of trees and shrubs, as also along the hedges, in meadows, on old walls, and in disused quarries. These are the positions in which the fronds of the Black Maidenhair Spleenwort attain their greatest size, but it will also bear continued exposure to sunshine, and when growing thus it is very dwarf and of a yellowish colour. It is also very useful for pot culture, as it thrives under glass in the cool-house, even better than it does in the outdoor Fernery. The soil in which this Fern grows most luxuriantly is a mixture of leaf mould, sandy loam, lime rubbish, and fibrous peat in about equal parts. Propagation may be effected by means of seedlings, spores being ripe about September; or by the divisions of the crowns in early spring, during March and April.

This useful species has, in its wild state, produced several variations, the most distinct of which are the following:

A. A.-n. acutum—ac-u′-tum (acute), *Bory.*

This is such a distinct form that Mr. E. J. Lowe, who in 1860 found it in great abundance in Spain, especially near Santander, Las Caldas, and at Fuente del Mar, where a long bank under a hedge was completely clothed with it, suggests that it may even be a distinct species. Its fronds, of very fine texture, are from 6in. to 18in. long and 3in. to 8in. broad at the base; they are borne on stipes (stalks) sometimes 9in. long, and are of a more graceful habit than those of the typical plant, from which this variety differs principally through its being more subdivided, as also through its thinner and more papery texture, and through the presence throughout the frond of linear-acute (narrow and pointed), erect segments and teeth. The sori (spore masses) are linear (very narrow), and are situated near the centre of the pinnules (leafits). The same plant has also been found in a wild state by Dr. Allchin and others at the Turk Waterfall, Killarney; at the foot of Cromaglaun, and Glouin Caragh, Inveragh; at Cahir Conree, near Tralee, and in other parts of Ireland, as well as in Jersey, and at Combe Royal, in South Devon.—*Lowe, Our Native Ferns*, ii., p. 173, fig. 514. *Nicholson, Dictionary of Gardening*, i., p. 128.

A. A.-n. decompositum—de-com-pos′-it-um (decompound or many times divided), *Moore.*

This variety, originally found at Manaton, in Devonshire, differs from *A. A.-n. acutum* in having the segments (sub-divisions) of the pinnules (leafits) less pointed and less rigid, and in having its fronds nearly quadripinnate (four times divided to the midrib). The absence of the linear (very narrow) segments and the blunt character of the teeth cause the form to be distinct.—*Lowe*, *Our Native Ferns*, ii., p. 183.

A. A.-n. grandiceps—gran′-dic-eps (large-crested), *Lowe.*

A most remarkable form, originally found growing wild in an old wall at Tramore, County of Waterford, Ireland, and one which seldom, if ever, attains the dimensions of the typical species. Its fronds, 8in. to 12in. long, including the stipes (stalks), have a depauperated (impoverished) appearance; they are only 1in. to 1½in. broad, on account of the pinnæ (leaflets) being short and slightly crested; even these leaflets—which are variously cut, differ much from each other in form, and are much serrated on the margins—are produced sparingly (Fig. 77), only three or four of them being found on a stalk, the greater portion of which is naked. The most distinguishing character of this variety, however, resides in the apex (terminal portion) of the frond, the stalk of which dilates and becomes flat, then branching and dividing many times expands into a broad crest, wedge-shaped at the base, and which gives the frond a very graceful outline; whereas the smaller tassels at the ends of the pinnæ render it very effective. This singular form has not been known to reproduce itself true from spores, and it is propagated exclusively by the division of the crowns.—*Lowe*, *Our Native Ferns*, ii., p. 177, fig. 520. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

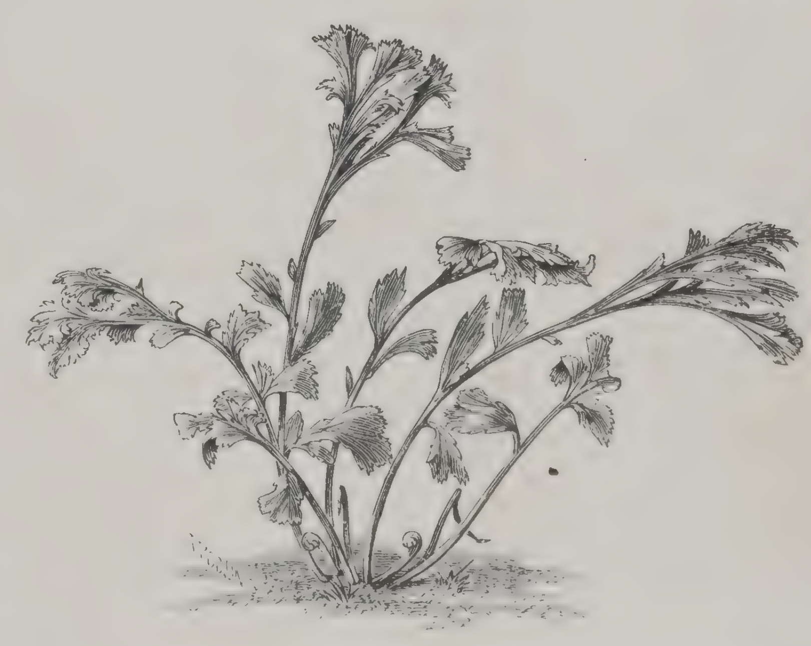


Fig. 77. Asplenium Adiantum-nigrum grandiceps (¼ nat. size).

A. A.-n. incisum—in-ci′-sum (cut), *Clapham.*

This very singular variety was originally found growing wild between Whitby and Scarborough. It is of smaller dimensions than most other forms, for its dwarf, ovate (egg-shaped) or ovate-triangular fronds, three times divided to the midrib, are seldom more than 8in. long. The pinnæ (leaflets), with which they are furnished on each side, are about as broad as long, and are cut into three secondary pinnules (leafits), the low lateral ones of which are wedge-shaped; all are cut into numerous long-pointed teeth, the central ones being the largest. The ultimate segments in some fronds are linear (thread-like).—*Lowe, Our Native Ferns*, ii., p. 181, fig. 526.

A. A.-n. leptorache—lep-tor-ach′-ĕ (having slender rachises or stalks), *Moore.*

This curious form, originally found in Glen Urquhart, in the Highlands, is remarkable for the length and the peculiarly slender nature of its stalks compared with the small dimensions of the leafy portions of the fronds; for while their stalks are quite 7in. long, the leafy parts of the fronds are barely 3in. long, ovate (egg-shaped), tripinnate (three times divided to the rachis), and shortly acuminate (terminating in a tapering point). The pinnæ (leaflets) are alternate (not opposite) and divided into small, wedge-shaped pinnules (leafits), which are themselves pinnatifid (divided half-way to the stalk) in the upper half. Each lobe is tipped with two small, very sharp teeth. This variety produces spores in great abundance. —*Lowe, Our Native Ferns*, ii., p. 179.

A. A.-n. microdon—mi′-crod-on (furnished with small teeth), *Moore.*

This very distinct variety, of medium size, originally found in a wild state in Guernsey and near Barnstaple, has fronds 6in. to 8in. long, including the stipes (stalks); they are broadest at the base, where they measure nearly 3in. across, and, compared with the fronds of either the original species or its other known varieties, are very little divided. The pinnæ (leaflets) are distinctly pinnate (cut down to the stalk) at the base, and are only pinnatifid (cut down partly to the stalk) above and in the upper part of the frond: they terminate in a broad, irregular apex cut only half-way to the midrib. These pinnæ have all the appearance of being entire (undivided), but their margin is everywhere minutely and sharply toothed. The sori (spore masses) in this curious form are placed near the costa (midrib) of the fertile leaflets.—*Lowe, Our Native Ferns*, ii., p. 174, fig. 515.

A. A.-n. obtusatum—ob-tu-sa′-tum (blunt), *Moore.*

A comparatively dwarf form, found wild in various and distant places in England—in Kent, at Torquay, and near Nottingham; also in Scotland, near Stirling and Ardrishaig, Argyleshire; in Ireland, in Antrim and at Newtown Castle; and in Guernsey. Its fronds, which in the smaller specimens are bipinnate (twice divided to the midrib), are from 2in. to 8in. long and ovate-acuminate (egg-shaped, with a tapering point) in form. Their pinnæ (leaflets) are somewhat short and bluntly triangular, and are furnished with pinnules (leafits) not very distinctly toothed. The larger specimens are tripinnate (three times divided to the midrib); otherwise the pinnæ and pinnules are the same as those of the smaller plants.—*Lowe, Our Native Ferns*, ii., p. 175, fig. 517.

A. A.-n. oxyphyllum—ox-yph-yl′-lum (sharp-leaved), *Moore.*

This very pretty little variety, originally found in Dunoon, in Argyleshire, and also near Stirling, is of medium dimensions. Its fronds, 4in. to 6in. long and ovate-lanceolate (egg-spear-shaped), are furnished with somewhat short pinnæ (leaflets), which, on account of the increased size of the anterior pinnule (leafit) at the base, occupy a very oblique position. The ultimate segments are narrow, and, like their teeth, sharp-pointed.—*Lowe, Our Native Ferns*, ii., p. 176, fig. 519. *Nicholson, Dictionary of Gardening*, i., p. 128.

A. A.-n. ramosum—ra-mo′-sum (branched), *Lowe.*

This very interesting form, found wild near Plymouth, differs from all other known varieties through its fronds, only 6in. long, having their main stalk branching about 1in. below their summit, where they branch again two or three times. Its pinnules (leafits) are but little divided, and they are of a very bright green colour and very smooth.—*Lowe, Our Native Ferns*, ii., p. 175, fig. 517.

A. A.-n. variegatum—var-ĭ-eg-a′-tum (variegated), *Wollaston.*

In this plant we have a very rare variety, originally found growing in the wall on the church of Shottisbrook, in Berkshire, in 1847, and subsequently also in Guernsey. It is a very handsome form; its fronds, normal in outline and of dimensions equal to those of the typical plant, being irregularly streaked and blotched with creamy-white. This variegation must not be confounded with the discoloration produced by the ravages of a green insect having all the appearances of a diminutive grasshopper, which frequently attacks hardy Ferns even in their wild state, and proves a dangerous introduction into any Fern collection, the more so that fumigation appears ineffectual for its destruction.—*Lowe*, *Our Native Ferns*, ii., p. 180, fig. 524.

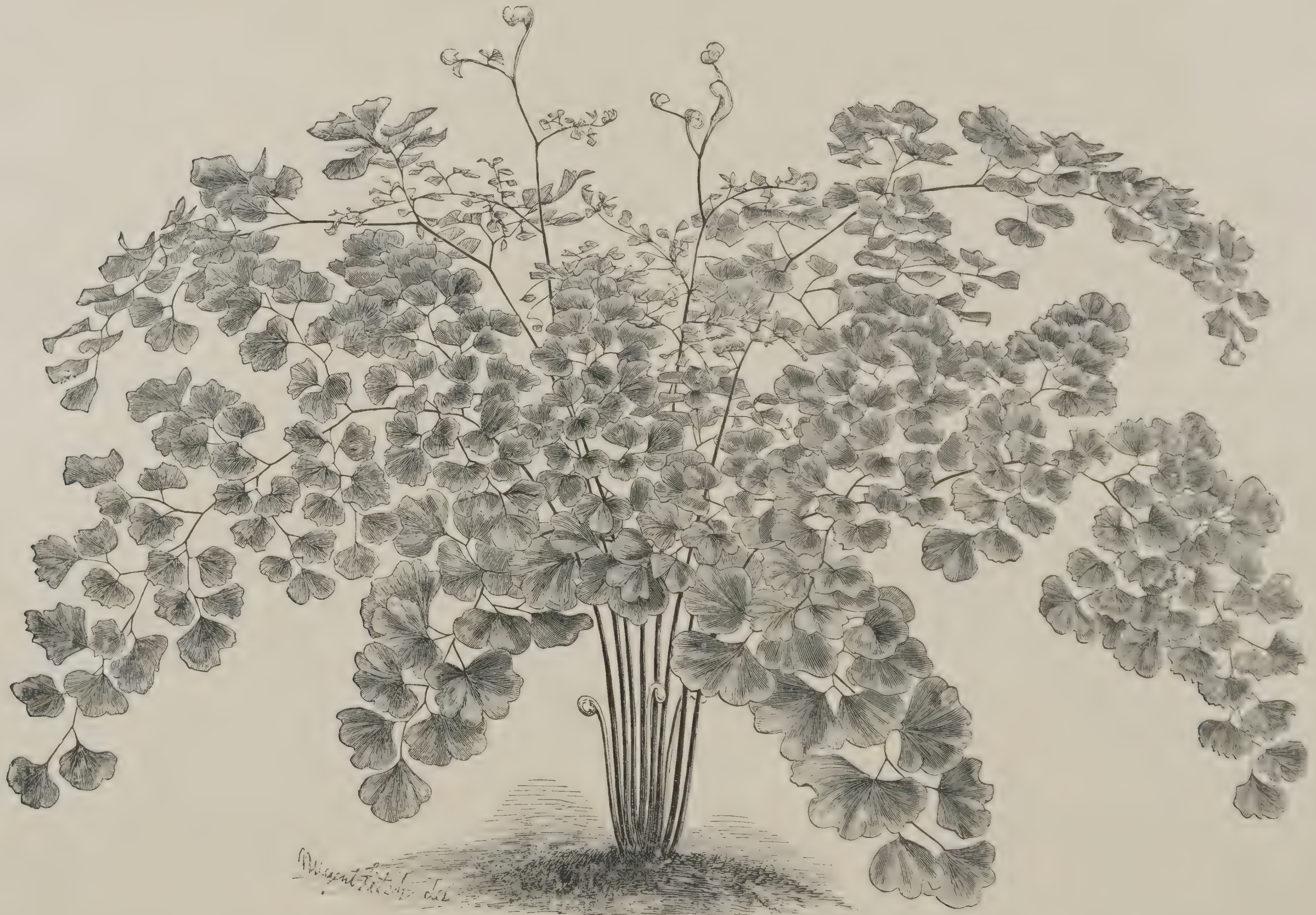
In his excellent work on British Ferns, Lowe describes twenty varieties of *A. Adiantum-nigrum*, and Mr. P. Neill Fraser, of Edinburgh, in a list of his collection, published in 1865, enumerates no less than twenty-six forms of the same species; but it is doubtful whether more than those above described are in existence in any collection at the present day.

A. (Euasplenium) affine—Eu-as-ple′-nĭ-um; af-fi′-nĕ (related), *Swartz.*

A stove species, native of Ceylon, Borneo, Fiji, and the Philippine Islands, and one which is closely related to the more popular *A. cuneatum*, but of more robust habit and having fronds frequently furnished with ten to fifteen pinnules (leafits) to the lower pinnæ (leaflets). These fronds, 1ft. to 1½ft. long and 9in. to 12in. broad, have their numerous leathery pinnæ cut down to the rachis (stalk of the leafy portion) into many distinct pinnules 4in. to 6in. long, which in their turn are also deeply lobed. The abundant sori (spore masses) are linear (long and very narrow).—*Hooker*, *Species Filicum*, iii., p. 170, t. 202. *Nicholson*, *Dictionary of Gardening*, i., p. 28. *Beddome*, *Ferns of Southern India*, t. 226.

A. (Euasplenium) alatum — Eu-as-ple′-nĭ-um; al-a′-tum (winged), *Hooker and Greville.*

This stove plant, native of the West Indies, Peru, Brazil, &c., may be distinguished at first sight from all other species through the broad and nearly transparent wings which may be observed on either side of the stipes (stalks) and between the pinnæ (leaflets) on the stalk, with a break where each pinna is attached (Fig. 78). The fronds, which are 1ft. to 1½ft. long, 3in. to 4in. broad, and borne on stalks 4in. to 6in. long, are simply pinnate (only once divided to the midrib). The pinnæ, which are numerous and disposed horizontally, are equal in size, except near the point of the frond, where they are



Adiantum Williamsii

(⅙ nat. size).

smaller and closer: most of them are 1½in. to 2in. long, almost sessile (stalkless), bluntish at the point, shortly wedge-shaped at the base, toothed on the margin, bright green, and of a thin, papery texture. Each frond, when fully developed, bears at its extreme end a solitary small bulbil, from which this species may readily be increased. The sori (spore masses) are distant, linear (long and very narrow), situate near the costa (midrib), which they do not reach, any more than they do the edge of the pinnæ.—*Hooker*, *Species Filicum*, iii., p. 121. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Lowe*, *New and Rare Ferns*, p. 27, t. 12B.

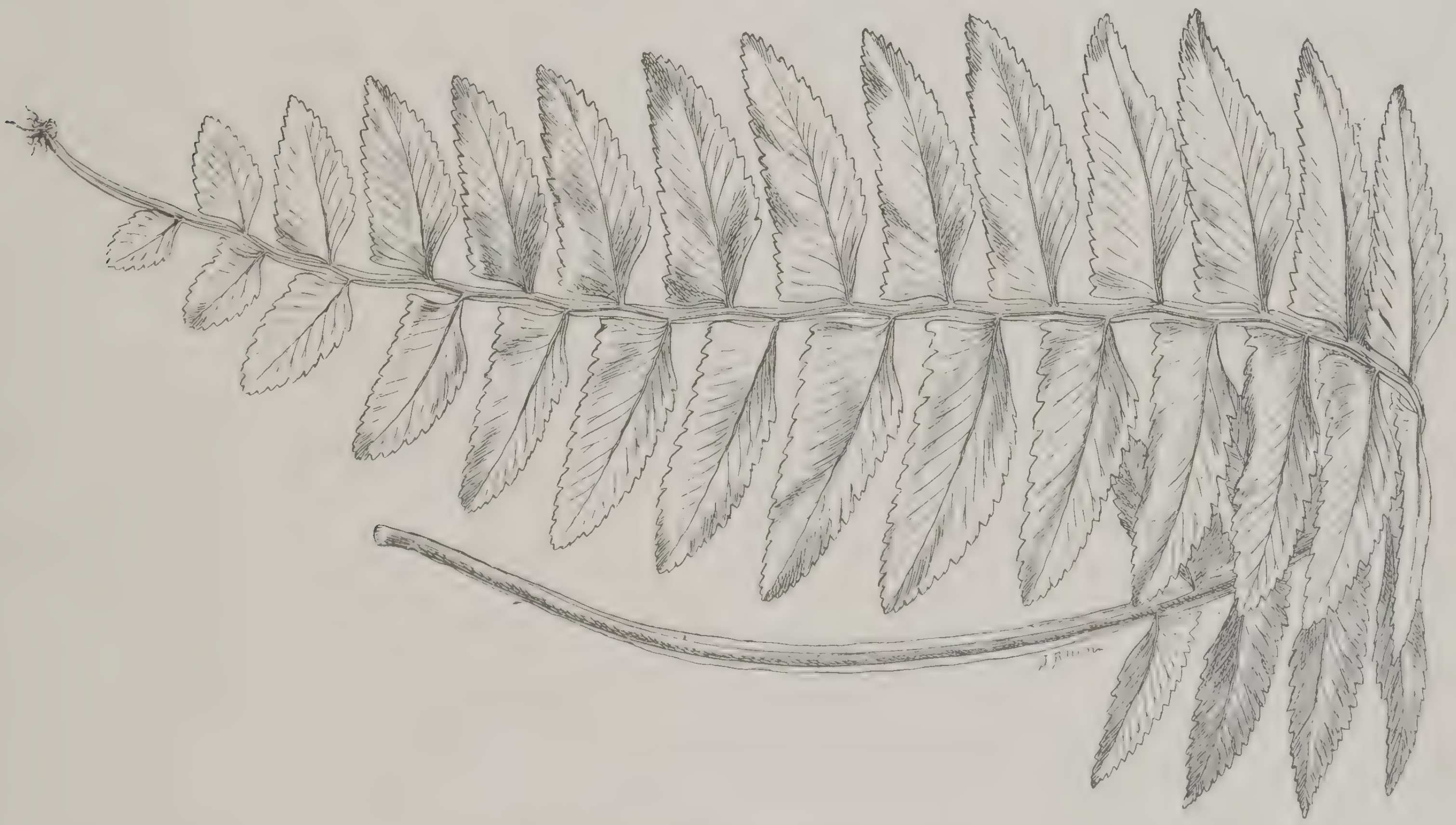


Fig. 78. Frond of Asplenium alatum
(⅔ nat. size).

A. (Anisogonium) alismæfolium—An-is-og-o′-nī-um; al-is-mæ-fol′-ĭ-um (Alisma-leaved), *Hooker*.

A stove species, native of the Isle of Luzon, with fronds 6in. to 9in. long, 2in. to 3in. broad, and of a leathery texture. These fronds, which vary in shape from simple (undivided) and oblong-spear-shaped to ternate (arranged by three) or even pinnate (divided to the midrib), are borne on firm, erect stipes (stalks) that are scaly throughout; their edges are smooth and their extremity terminates in a tapering point. When the plants are strong and the fronds are fully developed the latter usually show a large terminal pinna leaflet and three pairs of lateral ones, each of which is like the entire frond of the simple form. The sori (spore masses), disposed on each side of the midveins, reach from these to the edge of the pinnæ.—*Hooker*, *Species Filicum*, iii., p. 267. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Euasplenium) alternans—Eu-as-ple′-nĭ-um; al-tern′-ans (alternated), *Wallich.*

This distinct and interesting, dwarf-growing, greenhouse species, native of Kumaon, Simla, and which, according to Beddome, grows wild on the Himalaya Mountains at an elevation of 6000ft., at first sight very much resembles our own British Scale Fern, *A. Ceterach* (*Ceterach officinarum*), of which it possesses all the outward appearance, cutting, &c., with the exception, however, of the dense scaly covering of the under-side that is quite characteristic of the species above named. Its fronds, 6in. to 8in. long and 1in. to 1¼in. broad, are borne on tufted stipes (stalks) 1in. to 2in. long and clothed with linear (long and narrow) scales; they are densely produced from a central crown, and are oblong-spear-shaped and simply pinnatifid (once only divided almost to the midrib). Their pinnæ (leaflets), bluntly lobed and of a very pleasing light green colour and almost leathery texture, reach down nearly to the lower part of the stalks, the lower ones growing smaller gradually and sometimes quite distinct. The sori (spore masses) are abundantly produced and of a nearly black colour.—*Hooker*, *Species Filicum*, iii., p. 92. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Beddome*, *Ferns of British India*, t. 59.

The most suitable places for this curious species are in the crevices of rocks in the Fernery, but it must be situated where it is not brought into immediate contact with drip or constant moisture; it will be found to thrive most luxuriantly when planted on stone with a little peat only.

A. (Euasplenium) alternifolium—Eu-as-ple′-nĭ-um; al-tern-if-ol′-ĭ-um (alternate-leaved). Synonymous with *A. germanicum*.

A. (Diplazium) ambiguum—Dip-laz′-ĭ-um; am-big′-ŭ-um (ambiguous). A synonym of the better-known *A. Shepherdii*.

A. (Euasplenium) angolense—Eu-as-ple′-nĭ-um ; an-go′-len-sĕ (from Angola), *Baker.*

A stove species, of medium growth and very singular appearance on account of its fronds, which are oblong-deltoid (in shape of a Greek delta, Δ), 5in. to 6in. long, being borne on tufted stalks 6in. to 12in. long, of a dull green colour, and furnished with a few minute, spreading, long and narrow scales. These fronds, which are gemmiparous (bearing small leaf-buds on their outer surface) and of an almost leathery texture, have their stalk continuously winged in the upper half and below the pinnæ (leaflets), which are three or four times divided, and of a particularly dark green colour. The abundant sori (spore masses) are regular, parallel, and reach from near the midrib to within a very short distance of the edge.—*Hooker*, *Synopsis Filicum*, p. 485.

A. (Euasplenium) angustatum — Eu-as-ple′-nĭ-um ; an-gus-ta′-tum (narrow), *Presl.*

This stove species, of Brazilian origin, is the nearest to *A. adiantoides*, but much less divided, with blunt, sessile, sub-spathulate pinnules (stalkless, nearly spoon-shaped leafits). Its fronds, 6in. to 12in. long and 4in. to 6in. broad, borne on naked, greyish stalks 6in. to 12in. long, are furnished on each side of their midrib with numerous pinnæ (leaflets) 2in. to 4in. long, 1½in. to 2in. broad, and of a thin, papery texture, showing its long and narrow sori (spore masses), which fall considerably short of the edge.—*Hooker*, *Synopsis Filicum*, p. 217.

A. (Euasplenium) angustifolium—Eu-as-ple′-nĭ-um ; an-gus-tif-ol′-ĭ-um (narrow-leaved), *Michaux.*

This is a very distinct and elegant, greenhouse Fern, native of North America, where, according to Eaton, it is found in Ontario and New England, extending westward to Wisconsin and southward to Kentucky, Virginia, and probably the mountains of Northern Georgia ; in these habitats it luxuriates in damp, rich woods, especially in the mountainous districts, and it is commoner in the states bordering on the Ohio than in New England. Unlike most of the known Aspleniums, the barren and fertile fronds are so different in appearance as to give the plant a character quite distinct from other species of the same genus. The barren fronds, slender and spear-shaped, smooth, of a delicate pale green colour and soft texture, are 1½ft. to 2ft. long, 4in. to 6in. broad, and simply pinnate (only once divided to the midrib); the pinnæ (leaflets) of these fronds are slightly wedge-shaped at the base, where they are about ½in. broad; from the middle they taper to a long and slender point, and their margin is finely dented. These pinnæ are very numerous, sometimes as many as forty each side of the midrib; the middle ones are the longest, the lower ones being gradually shorter, more distant, and slightly deflexed, so that the lowest are often mere auricles (ears) a few lines long. The leaflets of the fertile fronds are narrower and more distant than those of the barren ones (Fig. 79). Both kinds of fronds arise from a rootstock which creeps just beneath the surface of the ground and attains a length of about 6in.; they are borne on stalks of a somewhat brittle nature, smooth and green, except at the very base, where they are black, like the rootstock itself. The abundant sori (spore masses) are disposed

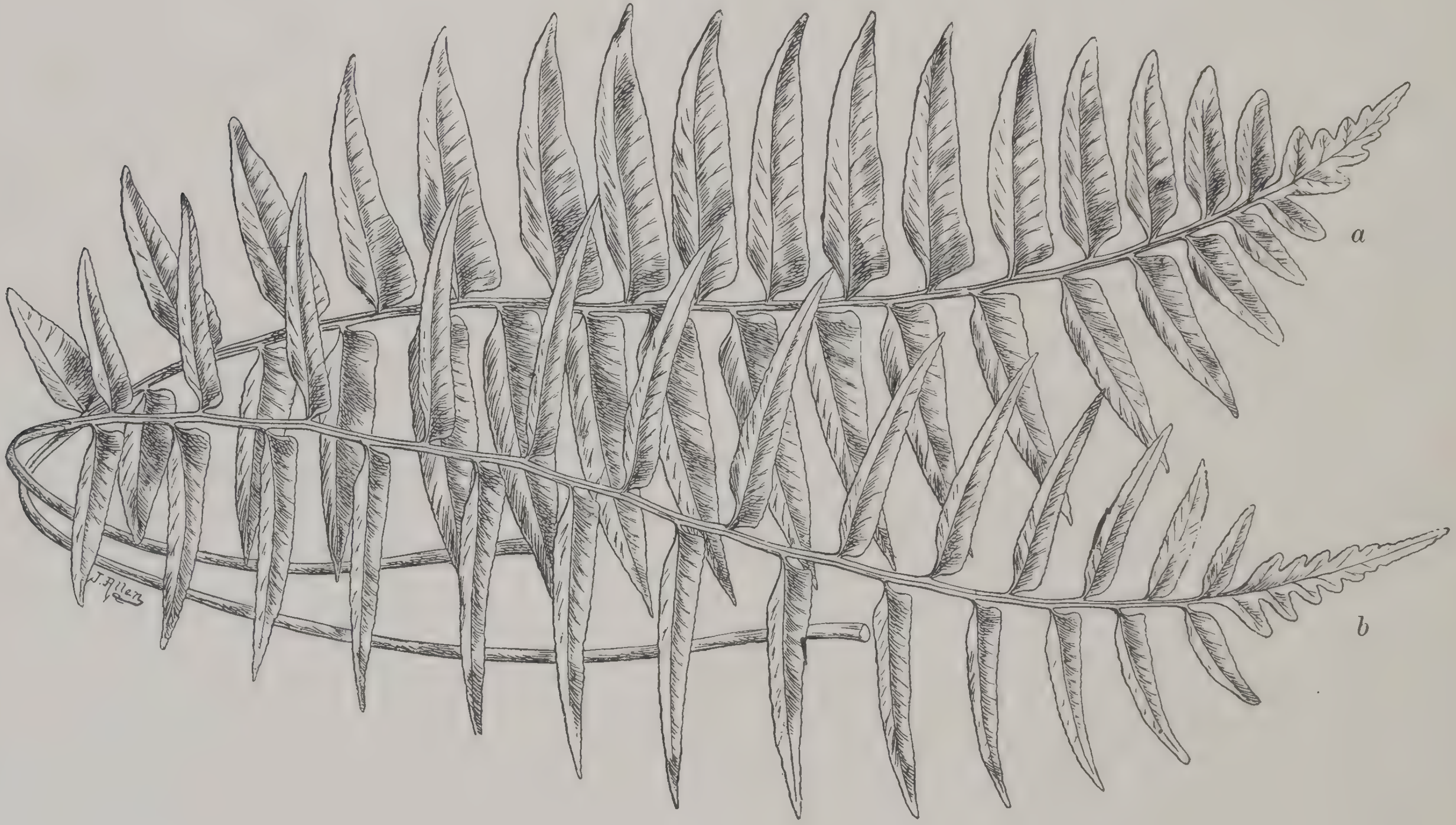


Fig. 79. (*a*) *Barren and* (*b*) *Fertile Fronds of Asplenium angustifolium*
(½ nat. size).

very closely and regularly in a single oblique row extending from the midrib nearly to the edge of each fertile pinna, where they eventually become confluent.—*Hooker*, *Species Filicum*, iii., p. 115. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Eaton*, *Ferns of North America*, ii., p. 73, t. 56. *Lowe*, *Ferns British and Exotic*, v., t. 24.

A. (Euasplenium) angustum—Eu-as-ple′-nĭ-um ; an-gus′-tum (narrow), *Swartz.*

Although the name of this species is somewhat similar to that of the two just described, the plant is totally different, for its fronds are quite entire (undivided) ; they are of a somewhat leathery texture, 1ft. to 2ft. long, 1½in. broad, and borne on short, tufted, erect stipes (stalks) of a greyish colour ; their extremity is much acuminated (ending in a long, tapering point) and their margin nearly smooth. The rather distant sori (spore masses) reach from the midrib nearly to the edge, in an oblique direction. This plant, being a native of Brazil and Guiana, requires stove treatment. —*Hooker*, *Species Filicum*, iii., p. 89.

A. (Euasplenium) anisophyllum—Eu-as-ple′-nĭ-um ; an-is-oph-yl′-lum (unequal-leaved), *Kunze.*

A greenhouse species, of large dimensions, native of Cape Colony and Brazil, and one which is easily recognised by the tumid involucres (swollen coverings) of its spore masses. Its fronds, oblong-spear-shaped, 1ft. to 2ft. long and 6in. to 9in. broad, are borne on tufted, firm, erect stipes (stalks) 6in. to 12in. long and scaly below ; they are only once divided to the midrib, which is furnished on each side with from ten to sixteen sub-sessile pinnæ (almost stalkless leaflets). The pinnæ are nearly horizontal, 3in. to 5in. long, barely 1in. broad, and terminate in a tapering point ; they are of a soft, papery texture. The short and regular sori (spore masses) are distant, elliptical, and do not reach more than half-way from the edge to the margin of the fertile pinnæ.—*Hooker*, *Species Filicum*, iii., p. 111, t. 166. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Euasplenium) apicidens—Eu-as-ple′-nĭ-um ; ap-ic′-id-ens (toothed at the apex). A variety of *A. Vieillardii.*

A. (Darea) appendiculatum—Da′-rĕ-a; ap-pen-dic-ul-a′-tum (having an appendage), *Presl.*

This greenhouse species, native of Australia and Tasmania, is closely related to the popular *A. bulbiferum.* Its fronds, of a dull, heavy green colour, are from 1ft. to 1½ft. long, lanceolate (spear-shaped), sub-tripinnate (nearly three times divided to the midrib), and furnished with oblong, pointed pinnæ (leaflets), the extremity of which is usually proliferous. The stalk and its ramifications are winged and clothed with scales, which round the rhizome (prostrate stem) are very dark. The bold and oblong sori (spore masses) are disposed one on each pinnule (leafit); they eventually become confluent, and cover the whole under-surface of the pinnules.—*Lowe, Ferns British and Exotic*, v., t. 18.

A. (Diplazium) arborescens—Dip-laz′-ĭ-um; ar-bor-es′-cens (tree-like), *Mettenius.*

This is a gigantic, stove species, native of the Mauritius, Bourbon, and Madagascar Islands. Its large and comparatively finely-divided fronds, 3ft. to 4ft. long and 2ft. to 3ft. broad, are borne on strong, erect, smooth stipes (stalks), which are produced from a caudex (stem) growing in an oblique direction. They are furnished with numerous pinnæ (leaflets), the lower ones usually being from 1ft. to 1½ft. in length and from 4in. to 6in. broad; these in their turn are subdivided into pinnules (leafits) fully 3in. long and ¾in. broad, and terminating in a tapering point. The leafits are of a soft, papery texture, and have their edge cut down two-thirds of the way to the stalk into nearly entire lobes ¼in. deep and ⅛in. broad. The lower sori (spore masses) are fully ⅛in. in length.—*Hooker, Species Filicum*, iii., p. 256. *Nicholson, Dictionary of Gardening*, i., p. 128.

A. (Euasplenium) arcuatum—Eu-as-ple′-nĭ-um; ar-cŭ-a′-tum (bent like a bow), *Liebmann.*

A very pretty, greenhouse species, native of Mexico, and closely related to the better-known *A. monanthemum*, of which it has all the appearance of being a smaller form, for its fronds are simply pinnate (once divided to the midrib) and are furnished with leaflets of the same shape as those of that species, and the stalks on which they are borne, though of much smaller dimensions, are equally tufted and of a blackish colour. The sori (spore masses), also, are short and parallel with the lower edge of the pinnæ (leaflets).—*Hooker*, *Species Filicum*, iii., p. 142, t. 189.

A. (Diplazium) Arnottii—Dip-laz′-ĭ-um ; Ar-nott′-ĭ-i (Arnott's), *Baker*.

A stove species, of gigantic dimensions, native of the Sandwich Islands, where it is said to be very abundant. Its fronds, borne on smooth, angular stalks of a brownish colour, are from 3ft. to 4ft. long ; their lower pinnæ (leaflets), 9in. to 12in. long and 4in. to 6in. broad, are furnished with pinnules (leafits) 3in. to 4in. long, 1in. or more broad, and of a soft, papery texture. The leafits are in their turn cut down to a distinctly-winged stalk into blunt, oblong lobes ½in. deep and ¼in. broad, with a space between them. The sori (spore masses), when mature, fill up nearly the whole surface of the lobes.—*Hooker*, *Synopsis Filicum*, p. 240. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Athyrium) aspidioides—Ath-yr′-ĭ-um ; as-pid-ĭ-ŏ-i′-des (Aspidium-like), *Schlechtendal*.

This very variable, greenhouse species possesses an extensive range of habitat, for it is found in the Sandwich Islands and in Madagascar, in the Cape Colony and at Fernando Po ; while Beddome tells us that on the Neilgherries, and especially about Otocamund, it is very abundant, principally along banks of streams and by roadsides. In the typical plant the fronds, borne on tufted, slender, straw-coloured stalks, naked except at the base, are from 1ft. to 2ft. long and from 8in. to 12in. broad ; they are tripinnatifid (cut three times half-way down to the stalk) ; their lower pinnæ (leaflets), spear-shaped, of a very soft, papery texture, and from 6in. to 9in. long, are in their turn divided into spear-shaped pinnules (leafits) cut down below nearly to the stalk into pinnatifid segments about ⅙in. broad. The colour of the leafy portion of the fronds is dark green, and both surfaces are naked. The copious sori (spore masses) are of oblong form and the lower ones are curved. In the variety *scandicinum* of Presl, the fronds are larger and more finely cut, and their deeply-pinnatifid segments look like so many linear (long and narrow) divisions, the whole breadth of which the spore masses sometimes occupy ; whereas Beddome says that a dwarf form with incurved pinnules has been found in quantities in all the Sholas. Although the extreme forms differ very widely, some of the American examples quite correspond with the Cape and East Indian plants.—*Hooker*, *Species Filicum*, iii., p. 223. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Beddome*, *Ferns of Southern India*, t. 157.

A. (Euasplenium) atrovirens—Eu-as-ple′-nĭ-um ; a′-tro-vir′-ens (dark green), *Baker*.

This stove species, native of the Solomon Islands, is very distinct. Its fronds, oblong-spear-shaped, 1½ft. to 2ft. long, and bearing a proliferous bud at their extremity, are borne on dull, blackish stalks, on which may be found a few scattered scales. The pinnæ (leaflets), ten to fifteen on each side of the midrib, are 5in. to 6in. long by about 1in. broad, and end in a tapering point slightly toothed towards the tip ; their texture is thin, but firm, and their surfaces are both naked and of a dark green colour. The sori (spore masses) are regular, parallel, and disposed about equidistant between the edge and the midvein.—*Hooker*, *Species Filicum*, iii., p. 109.

A. (Euasplenium) attenuatum — Eu-as-ple′-nĭ-um ; at-ten-ŭ-a′-tum (attenuated), *Robert Brown*.

This singular, dwarf, rigid Fern, native of New South Wales and Queensland, requires stove temperature. Its dark green fronds, their fleshy texture, and their narrow, ragged outline (Fig. 80), contrast singularly with other species. They are scarcely divided, becoming pinnatifid (divided half-way to the stalk) only at the base ; they rise from a short, erect crown, and are borne on short stalks covered with narrow, blackish scales ; their length varies between 6in. and 12in., and they are usually proliferous at their extremity. The lowest lobes, which are oblong or roundish, reach down nearly or quite to the crown. The large and comparatively few sori (spore masses) occupy much of the lower surface, where they reach nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 92. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Lowe*, *Ferns British and Exotic*, v., t. 35B.

A. (Ceterach) aureum—Ce′-ter-ach ; au′-rĕ-um (golden). A variety of *A. Ceterach*, popularly known as *Ceterach officinarum*.

A. (Euasplenium) auriculatum—Eu-as-ple′-nĭ-um ; aur-ic-ul-a′-tum (auriculated or eared), *Swartz.*

A stove species, native of South America, where it is found abundantly from Mexico and the West Indies southward to Brazil and Peru. Its fronds, 1ft. to 1½ft. long, 4in. to 6in. broad, and borne on firm, erect, nearly naked stalks 4in. to 8in. long, are furnished on each side of their rachis

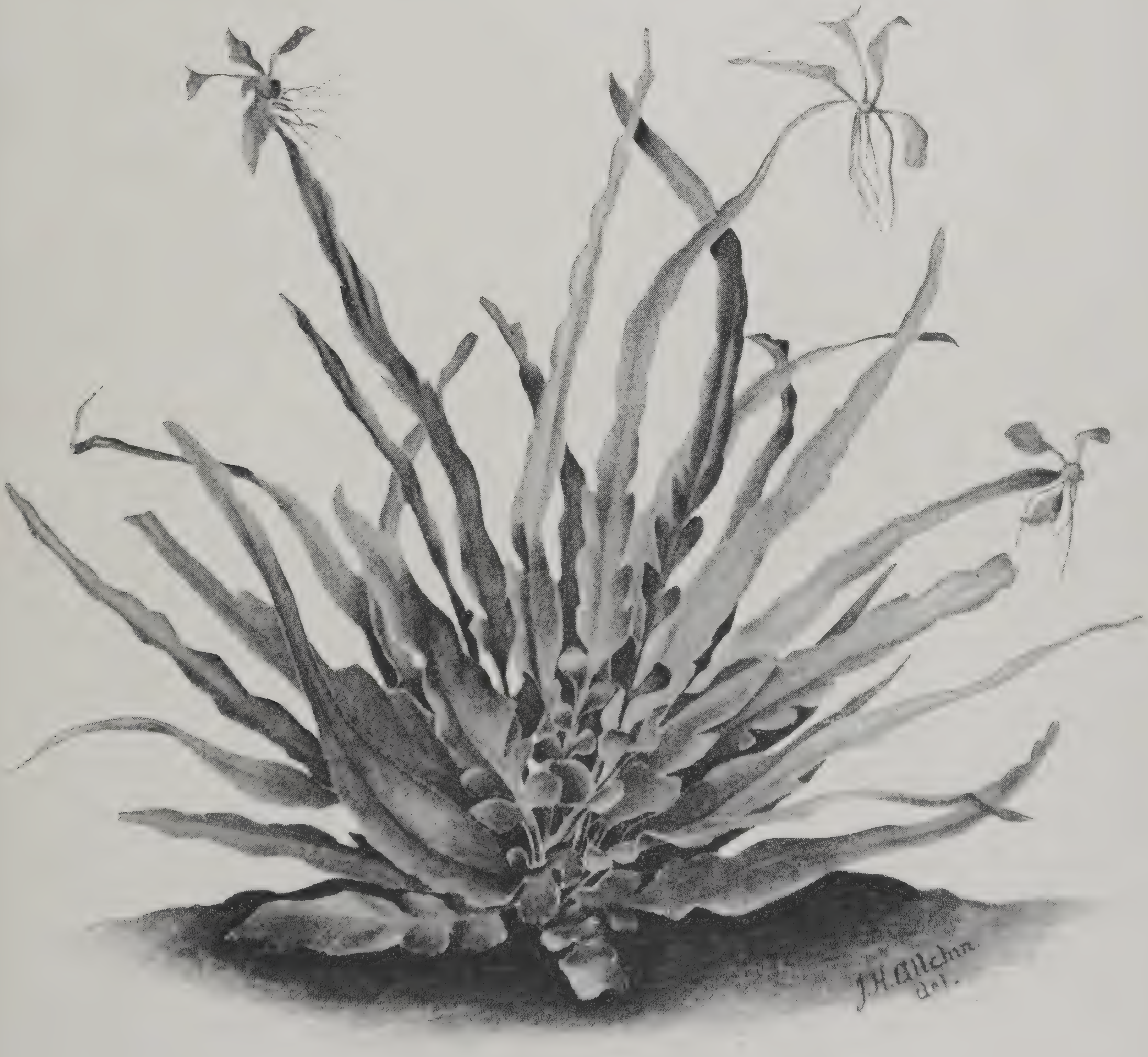


Fig. 80. Asplenium attenuatum
(⅓ nat. size).

(stalk of the leafy portion) with from ten to twenty pinnæ (leaflets) 2in. to 4in. long and about 1in. broad. The pinnæ occupy a nearly horizontal position and are attached to the midrib by short stalks; they are subfalcate (somewhat sickle-shaped), have their edge crenate (deeply toothed), and their two sides unequal, the upper one showing at the upper half of the pinna a distinctly cordate (heart-shaped) auricle, which is the most distinguishing character of this plant. The sori (spore masses) are distant, and are situated close to the midvein, which they do not reach, any more than they do the edge.—*Hooker*, *Species Filicum*, iii., p. 118, t. 171. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Euasplenium) auritum—Eu-as-ple′-nĭ-um; au-ri′-tum (eared), *Swartz.*

This stove species, though common in Tropical America, is also found in the Bourbon Islands and in Madagascar, and, according to Beddome, it is plentiful on the Neilgherries and Anamallays, where it grows principally on rocks in the bed of the Toracaddoo River, at an elevation of 4500ft. Its fronds, produced from a thick, decumbent rhizome, are borne on firm, erect, naked stalks 4in. to 8in. long and of a greyish colour. They are from 9in. to 12in. long, 2in. to 4in. broad, and furnished on each side of their stalk with ten to fifteen distinctly-stalked pinnæ (leaflets) about 2in. long; the extremity of these pinnæ is somewhat blunt, and the edge sharply toothed or often lobed, especially towards the base, which is distinctly auricled (eared) and suddenly narrowed. The whole of the plant is of a bright green colour, and the sori (spore masses) are disposed in two broad and rather oblique rows.—*Hooker*, *Species Filicum*, iii., p. 179. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Lowe*, *Ferns British and Exotic*, v., t. 32. *Beddome*, *Ferns of Southern India*, t. 137.

A. (Thamnopteris) australasicum—Tham-nop′-ter-is; aus-tra-las′-ic-um (Australian). A variety of *A. Nidus*.

A. (Athyrium) axillare—Ath-yr′-ĭ-um; ax-il-la′-rĕ (axillary), *John Smith.*

This interesting, large-growing, yet elegant, greenhouse species is a native of Madeira and the Azores. The fronds, which are 2ft. to 3ft. long, are borne on stipes (stalks) about 1ft. long and scaly at the base; they are smooth, nearly spear-shaped, and of a pendulous habit. The pinnules (leafits) being narrow, distant, falcate (sickle-shaped), and drooping, the fronds have a particularly elegant outline, which is enhanced by the finely-toothed nature of the segments (sub-divisions) of the pinnules. The oblong sori (spore masses) are disposed sometimes two on the same vein.—*Lowe*, *Ferns British and Exotic*, v., t. 39.

A. (**Diplazium**) **bantamense**—Dip-laz′-ĭ-um; ban-tam-en′-sĕ (native of Bantam), *Baker.*

A stove species, of little decorative value, native of Hong-Kong and Borneo, and, according to Beddome, also of the Khasya Hills, Penang, and Assam.—*Hooker*, *Species Filicum*, iii., p. 240. *Beddome*, *Ferns of British India*, t. 69.

A. (**Euasplenium**) **Baptistii**—Eu-as-ple′-nĭ-um; Bap-tis′-tĭ-i (Baptist's), *Moore.*

This very handsome, stove species, of medium growth, is a native of the South Sea Islands, the habitat of many good Ferns known in cultivation. It is a perfectly distinct plant, producing from a stout, decumbent caudex (stem) broadly ovate (egg-shaped) fronds about 1ft. long, borne on stipes (stalks) 6in. to 8in. long; they are bipinnate (twice divided to the midrib). The pinnæ (leaflets), about 5in. long, are borne on short stalks; each of them is provided with four narrow pinnules (leafits) 2in. long, equally disposed on short, slender stalks, and a terminal lobe, 3½in. long and ¼in. broad, furnished with distinct marginal teeth pointing forwards, and terminating in a long-attenuated point, which is toothed nearly to the end. The slender stalks of both pinnæ and pinnules give a very open appearance to the centre of the fronds, which are of a thick and leathery texture, and dark green in colour. The long, narrow, and straight sori (spore masses) are parallel with, and close to, the midrib.—*Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (**Euasplenium**) **Beddomei**—Eu-as-ple′-nĭ-um; Bed-do′-mĕ-i (Col. Beddome's). Synonymous with *A. crinicaule.*

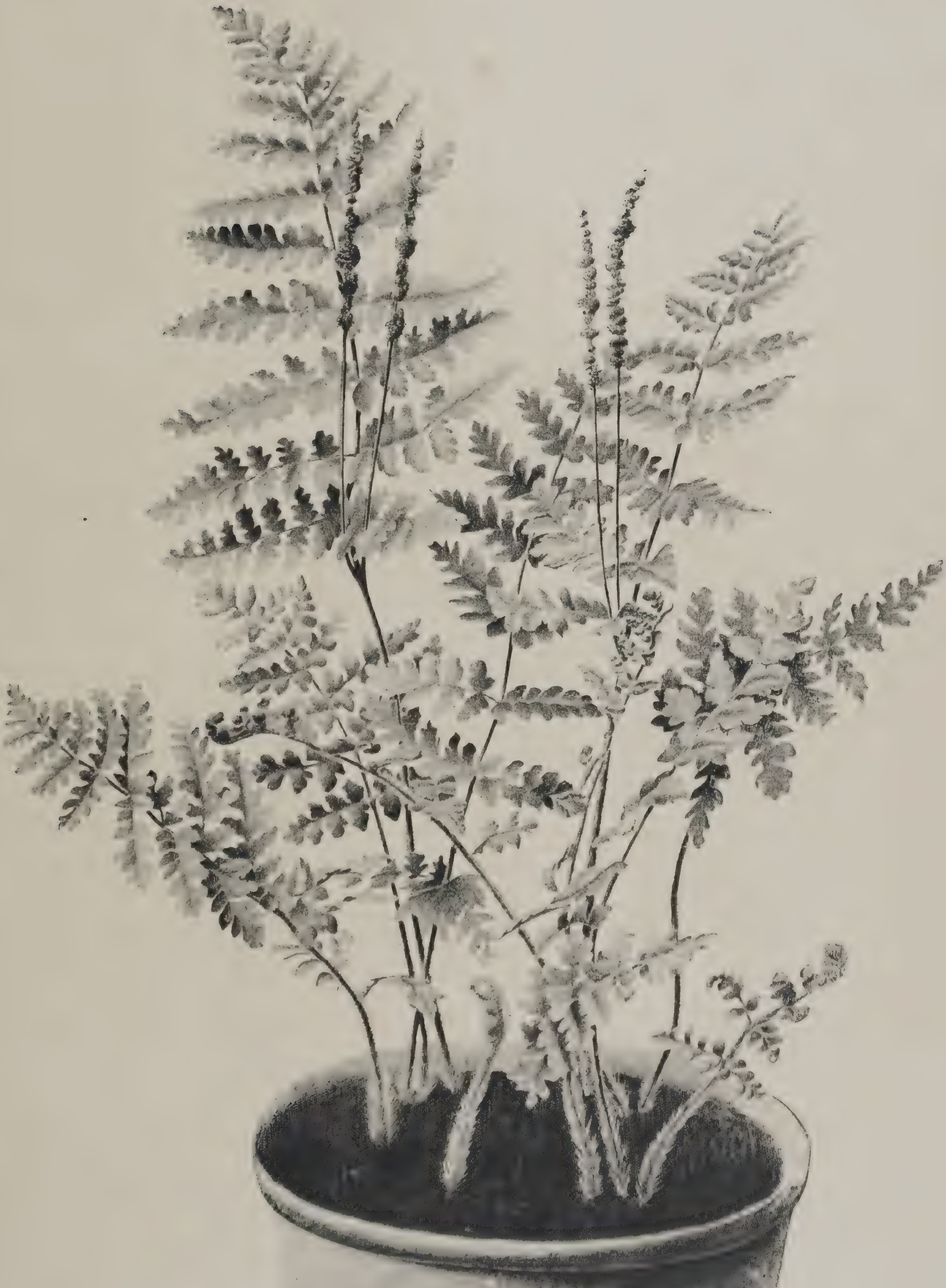
A. (Darea) Belangeri—Da′-rĕ-a; Bel-an′-ger-i (Belanger's), *Kunze.*

This handsome and deservedly popular, stove species, native of Java, Sumatra, and Borneo, is one of the most elegant plants of the genus, forming a graceful plume of finely-divided fronds, spreading on all sides (see Plate). It is perhaps more extensively known as *A. Veitchianum*, but whichever name may receive the preference, no collection, large or small, should be without it, on account of its distinctive characters, its compact and even growth, and the elegance of its general appearance. The fronds, 1ft. to 1½ft. long, 2in. to 3in. broad, and bipinnate (twice divided to the midrib), are borne on firm, erect, smooth stipes (stalks) of a greenish colour and from 4in. to 8in. long. The numerous and closely-set pinnæ (leaflets) are almost horizontal, 1in. to 1½in. long, ½in. broad, and proliferous on their entire length; they are rounded at the point, truncate at the base on the lower side, and regularly cut down throughout to a broadly-winged rachis (stalk) into blunt, linear lobes or pinnules (leafits); the latter are all simple except the basal one on the upper side of the pinnæ, which is always bifid (once forked) and frequently trifid (twice forked). The spore masses, produced over the whole under-surface of the frond, are long and narrow; one is disposed on each segment or lobe, where it is situated on the exterior side, and as is characteristic of plants belonging to the sub-genus *Darea*, these spore masses open on the outward side—that is, on the side turned away from the rachis. *A. Belangeri* is a beautiful, evergreen plant, which does not require any special care in its cultivation, but it must be borne in mind that slugs and woodlice, the latter especially, have a particular liking for it when within their reach.—*Hooker*, *Species Filicum*, iii., p. 209. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Lowe*, *Ferns British and Exotic*, v., t. 5. *Beddome*, *Ferns of British India*, t. 287.

A. (Darea) bifidum—Da′-rĕ-a; bif′-id-um (divided about half-way in two).

A puzzling and variable plant, from the fact that it runs gradually into forms with the leaflets again pinnate, with small narrow pinnules, or with these again deeply bifid or pinnatifid. It is identical with *A. lineatum.*

A. biforme—bif-or′-mĕ (having two forms). A garden appellation for *A. dimorphum.*



Anemia tomentosa

(¼ nat. size)

A. (Euasplenium) bipartitum—Eu-as-ple′-nĭ-um; bip-ar-ti′-tum (divided into two, nearly to the base), *Bory.*

A stove species from the Mascaren Islands, closely related to *A. auritum*, but of less rigid habit. Its fronds, seldom more than 8in. long and from 2in. to 3in. broad, are borne on firm, yet slender, naked stalks of a greyish colour and from 3in. to 4in. long; they are composed of twelve to fifteen pairs of conspicuously-stalked pinnæ (leaflets), bluntish at the point and cut down at the base on the upper side into distinctly-stalked, cuneate pinnules (wedge-shaped leafits) of a soft, papery texture. The sori (spore masses) are disposed in two regular rows, which reach nearly to the edge of the pinnules.—*Hooker*, *Species Filicum*, iii., p. 178, t. 208. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Darea) bipinnatum—Da′-rĕ-a; bip-in-na′-tum (twice divided to the midrib), *Brackenridge.*

A very pretty, stove species, native of Fiji. Its fronds, seldom more than 8in. long, 1in. to 1½in. broad, and borne on naked, wiry stipes (stalks) of a slender nature, are very elegantly cut; there are on each side of the rachis (stalk of the leafy portion) from twelve to twenty closely-set pinnæ (leaflets); these are cut down to their rachis into linear (long and narrow), slightly flattened, somewhat leathery pinnules (leafits), the lowest of which are pinnatifid (divided half-way to the midrib). The small and solitary sori (spore masses) are situated on the margins of the pinnules.—*Hooker*, *Synopsis Filicum*, p. 221.

A. (Euasplenium) bisectum—Eu-as-ple′-nĭ-um; bis-ec′-tum (bisected), *Swartz.*

A stove species, native of the West Indies and Ecuador, with fronds from 1ft. to 1½ft. long, 4in. to 6in. broad, and borne on firm, erect, nearly naked stalks of chestnut-brown colour and 4in. to 6in. long; they are composed of twenty to thirty pairs of horizontal pinnæ (leaflets) 2in. to 3in. long, with a very long, narrow, and deeply-pinnatifid upper portion. These pinnæ, of a somewhat leathery texture, show the sori (spore masses) disposed in two parallel rows close to the midrib.—*Hooker*, *Species Filicum*, iii., p. 152, t. 192. *Nicholson*, *Dictionary of Gardening*, i., p. 128.

A. (Darea) borbonicum—Da′-rĕ-a ; bor-bo′-ni-cum (from Bourbon), *Hooker*.

A very pretty, stove species, native of Mauritius and the Bourbon Islands ; it is very similar to the better-known *A. rutæfolium*, from which it is distinguished only by the greater breadth of its fronds, which are not quite so finely divided as those of that popular species.—*Hooker*, *Species Filicum*, iii., p. 207.

A. (Euasplenium) borneense—Eu-as-ple′-nĭ-um ; bor-ne-en′-sĕ (from Borneo), *Hooker*.

This stove species, native of Borneo, is somewhat near *A. cultrfolium*, but it is a stronger plant, with blunter and more unequal-sided pinnæ (leaflets) dwindling downwards very gradually. Its fronds, fully 3ft. long, 2½in. broad, and borne on stout, greyish stipes (stalks) 3in. to 4in. long, are furnished with numerous sessile (stalkless) pinnæ of a thin, papery texture, the lower ones growing smaller very gradually, the central ones 1¼in. long, with their point bluntly rounded, their upper edge auricled (eared) inwards and distantly toothed. The sori (spore masses), which in this singular species are sparingly produced, are disposed in almost parallel rows.—*Hooker*, *Species Filicum*, iii., p. 135, t. 186.

A. (Darea) brachypteron—Da′-rĕ-a ; brach-yp′-ter-on (broadly-winged), *Kunze*.

This exceedingly interesting, greenhouse species, native of Madagascar and Fernando Po, where it is found at a great elevation, is of dwarf habit and delicate texture. Although of remote introduction, it has not been so widely distributed as it really deserves. Perhaps the fact of its being a native of countries reputed warm has caused it to be kept in a higher temperature than it requires, and it has consequently been, in many instances, lost after a short trial. The warmest end of a greenhouse, or the coolest end of the stove, suits it best. Its pretty fronds (Fig. 81), 4in. to 6in. long and 1in. to 1½in. broad, borne on wiry, naked stalks 2in. to 4in. long, are smooth, horizontal, and bipinnate (twice divided to the midrib). The pinnæ (leaflets), which number from twenty to twenty-four on each side of the rachis (stalk of the leafy portion), are of very peculiar yet pretty shape, inasmuch as from half to nearly the whole of the lower side is cut away; the largest of them are cut down to the rachis into simple or forked, long and narrow pinnules (leafits), the inferior one being the largest. The oblong and solitary sori (spore masses) are often quite marginal. In this pretty Fern the finely-cut fronds, of a bright green colour, are abundantly produced from a short, upright stem; they also possess the peculiarity of growing perfectly horizontal, and of producing a young plant at their extremity, on which account the plant is very useful for hanging baskets of small dimensions.—*Hooker*, *Filices Exoticæ*, t. 14. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Lowe*, *Ferns British and Exotic*, v., t. 15B.

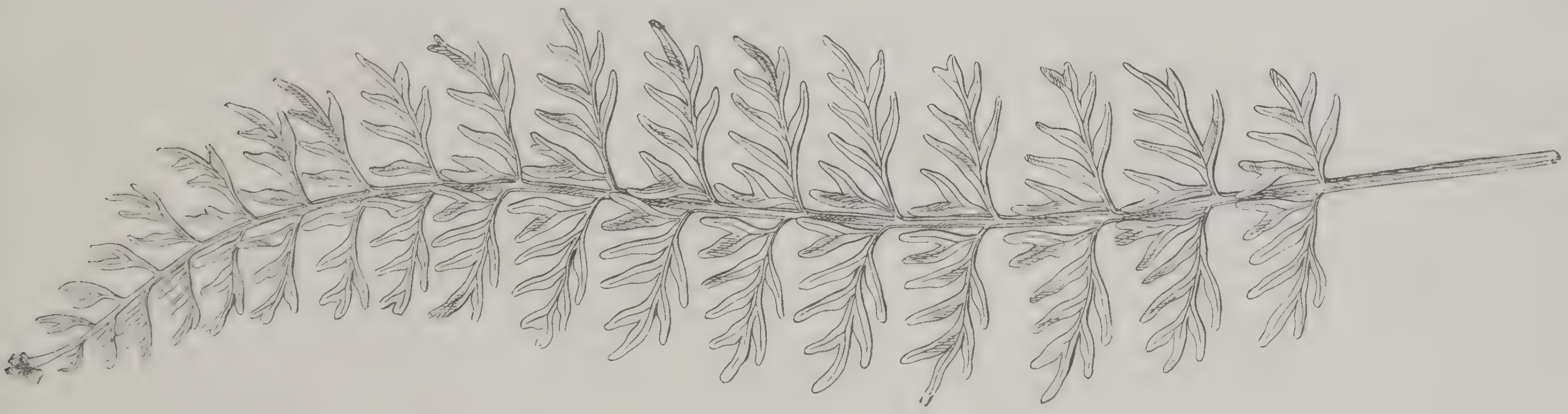


Fig 81. Frond of Asplenium brachypteron
(nat. size).

A. (**Diplazium**) **Brackenridgei**—Dip-laz′-ĭ-um; Brack-en-ridg′-ĕ-i (Brackenridge's), *Baker*.

A stove species, of medium dimensions, native of the Fiji and Philippine Islands, greatly resembling the better-known *A. sylvaticum*, from which it differs by its pinnæ (leaflets), which are broader, distinctly stalked, of a firm texture, and often produce bulbils from their axils.—*Hooker*, *Synopsis Filicum*, p. 234.

A. (**Euasplenium**) **Bradleyi**—Eu-as-ple′-nĭ-um; Brad-ley′-i (Bradley's), *Eaton*.

This pretty little, greenhouse species is a native of East Tennessee, where it was discovered growing on shaded sand-rocks on the top of the Walden Ridge, in the Cumberland Mountains; it has also been found in Morgan, Roane, Edmonson, Estill, and Rockcastle Counties, and in Arkansas, near the White River, in North America. According to Eaton, it is very variable in the shape of its fronds as well as in the degree of incision of their pinnæ (leaflets); the narrower and less-divided forms have some resemblance to the better-known *A. ebenum*, while the larger forms have so much of the appearance of *A. lanceolatum* as to suggest its being a hybrid between these two species. The fronds are abundantly produced, and are borne on stalks 2in. to 3in. long, polished, and nearly black, which colour continues up to the middle part of the frond, except in the smaller specimens; they are usually pinnate, but in fully-developed specimens are frequently pinnatifid (cut down part of the way to the midrib) and even bipinnate (twice divided to the midrib); they are from 5in. to 7in. long, oblong-spear-shaped, and furnished with eight to twelve pairs of pinnæ, the lower ones the largest, and all of them short-stalked and more or less deeply toothed. The sori (spore masses) are short and subcostular (placed close to the midvein of the fertile pinnæ).—*Eaton*, *Ferns of North America*, ii., p. 39, t. 51. *Hooker*, *Synopsis Filicum*, p. 487.

A. (Euasplenium) brasiliense — Eu-as-ple′-nĭ-um; bras-il-ĭ-en′-sĕ (from Brazil), *Moore and Houlston.*

A stove species, native of Brazil and other parts of South America, with simple (undivided) fronds, like those of the popular Bird's-nest Fern, *A. Nidus*, and produced from an erect crown; they are from 1ft. to 3ft. long, of a deep green colour, smooth, leathery, slightly undulated, and their leafy portion extends nearly to the crown itself, as the somewhat scaly stipes (stalks) are seldom more than 1in. long. The form of the fronds is that of an elongated spear-head; they are smooth on the margins and proliferous at their extremity. The sori (spore masses) are situated on the lateral veins, and extend from near the midrib half-way to the edge of the frond, and this fructification, being prettily shown on the thick, fleshy, green fronds, renders the plant particularly attractive.—*Lowe*, *Ferns British and Exotic*, v., t. 15B.

A. (Athyrium) brevisorum — Ath-yr′-ĭ-um; brev-is-o′-rum (having sori disposed in short patches), *Wallich.*

A stove species, from Ava, Mishmee, and the Sandwich Islands, somewhat like *A. achilleæfolium*, but much larger and more divided. Its fronds, 2ft. to 3ft. long and 9in. to 18in. broad, are borne on erect, slender, naked stalks of a grey colour and from 1ft. to 1½ft. long. The pinnæ (leaflets) are longest at the base of the frond, where they measure 1ft. or more, and are divided into lanceolate pinnules (spear-shaped leafits) 2in. to 3in. long, which in their turn are subdivided into segments of the same shape as the pinnules, but deeply and sharply toothed, and of a soft, papery texture. The abundant sori (spore masses) are usually disposed from six to twelve to a segment in two rows near the midrib, the lower ones curved, often double.—*Hooker*, *Species Filicum*, iii., p. 229. *Nicholson*, *Dictionary of Gardening*, i., p. 128. *Beddome*, *Ferns of British India*, t. 241.

A. Brownii—Brown′-ĭ-i (Brown's). Synonymous with *A. umbrosum.*

A. (Euasplenium) bulbiferum — Eu-as-ple′-nĭ-um ; bul-bif′-er-um (bulbil-bearing), *Forster.*

This very handsome, greenhouse species, native of New Zealand, Australia, New Caledonia, &c., is a universal favourite with Fern cultivators, and is perhaps the best-known and most universally grown of all the Aspleniums. Its popularity is no doubt due to its rapid growth, its robustness, and its easy cultivation ; while its being viviparous (bud-bearing) in the highest degree is certainly the cause of its being so widely distributed as to be met with in almost every collection. It possesses another claim to the attention of the cultivator inasmuch as it is one of the best of all known Ferns to withstand the atmosphere of the dwelling-room. Its fronds, 1½ft. to 2ft. long and 8in. to 12in. broad, are borne on stipes (stalks) 6in. to 10in. long, green on the upper side and brown below ; they are lanceolate (spear-shaped), bearing numerous pinnæ (leaflets) that are oblong in shape, 4in. to 8in. long and 1½in. to 2in. broad, cut down to a compressed, winged stalk into numerous somewhat egg-shaped pinnules (leafits), the largest of which are usually situated near the midrib and wedge-shaped at the base. These pinnules, of a soft texture and pale green colour, are again cut into slightly-toothed, long, narrow segments, the whole breadth of which is eventually occupied by the sori (spore masses), which are oblong in shape and mostly disposed in a double row, gradually becoming confluent. Though of a naturally erect and somewhat stiff habit, the fronds are usually rendered quite pendulous by the great quantities of young plants with which their entire surface is covered at some time of the year, and these young plants may frequently be seen with half-a-dozen fronds of their own. See Coloured Plate.—*Hooker*, *Species Filicum*, iii., p. 196. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Ferns British and Exotic*, v., t. 11. *Beddome*, *Ferns of British India*, t. 65.

Besides *A. Martensianum* and *A. Shuttleworthianum*, both of Kunze, which appear to be large, quadripinnatifid (four times divided half-way to the midrib) forms of this species bearing their sori on the edge of the segments, several distinct and well-marked forms are recognised, the principal of which are the two following:

A. b. Fabianum—Fab-ĭ-a′-num (Fabia's), *Humboldt and Jacquin.*

This is a very ornamental form, of robust constitution, with fronds 1½ft. to 2ft. long, of a dark, shining green colour, and rendered much lighter in appearance than those of the species through their lower segments being much narrower and deeply cleft; when fully developed they also possess a more graceful and arching appearance, produced by the quantity of young plants, the weight of which renders the fronds beautifully pendulous. —*Hooker*, *Synopsis Filicum*, p. 218. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

This Fern is admirably adapted for table-decoration, for vases, &c., as it is perfectly evergreen, and as very good-sized plants with a quantity of foliage can be grown in pots of comparatively small dimensions. Although it thrives in the mixture recommended for Aspleniums in general, this variety grows most luxuriantly in peat and sand alone, in which soil it will be found to produce fronds of larger dimensions and especially of a much brighter green colour.

A. b. laxum—lax′-um (loose), *R. Brown.*

Commonly known in commerce under the name of *A. laxum pumilum*, probably on account of its compact habit, this is perhaps the handsomest form known of the variations of *A. bulbiferum*. The fronds, which are produced from a thick, fleshy crown, are plentiful, and of a peculiarly dark, shining green colour; they are barely 1½ft. long and about 8in. broad when the plant has attained its full development, but they are remarkably elegant on account of their being tripinnatifid (three times divided half-way to the midrib) and of a slender nature, with pinnæ (leaflets) as finely cut as in *A. b. Fabianum*, and segments (sub-divisions) of the pinnules (leafits) so narrow that the sori (spore masses) often appear as if marginal (situate on their very edge). The most distinctive character of this variety, however, resides in the closeness of the crown, which, instead of forming a sort of shuttlecock as in all other Aspleniums, is always well filled up with fronds falling outwardly, forming a most compact and symmetrical plant.—*Hooker*, *Synopsis Filicum*, p. 218. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

A. canariensis—can-a′-rĭ-en′-sis (from the Canaries). Synonymous with *A. Ceterach aureum.*

A. (Euasplenium) Carruthersii—Eu-as-ple′-nĭ-um ; Car-ruth′-ers-ĭ-i (Carruthers'), *Baker.*

A very distinct, stove species, native of Viti, whose oblong-spear-shaped fronds, from 6in. to 15in. long and borne upon short grey stipes (stalks) bordered upwards with a few closely-pressed, small, brown scales, are furnished with only four or five pairs of pinnæ (leaflets). These pinnæ, of a pale grey-green colour and coriaceous (leathery) texture, are set a little distance apart, distinctly stalked, 4in. to 5in. long, and more or less toothed, according to the age and state of development of the subject. The sori (spore masses), about ¼in. long and regular, are subcostular (disposed close to the midvein, falling far short of the edge).—*Hooker*, *Synopsis Filicum*, p. 483.

A. (Euasplenium) caudatum—Eu-as-ple′-nĭ-um ; cau-da′-tum (tailed), *Forster.*

This is a very interesting and highly-decorative, stove species, native ot India, Polynesia, Java, Brazil, Ecuador, &c., so that its range of habitat is very extensive. Its handsome fronds, 1½ft. to 2ft. long, 4in. to 8in. broad, and borne on firm stalks 4in. to 6in. long, densely clothed with fine, small, brown scales, are composed of from twenty to thirty pairs of pinnæ (leaflets) 3in. to 4in. long and comparatively narrow, seldom 1in. broad, elongated, spear-shaped, usually opposite, and pinnatifid (divided half-way to the midrib) ; these pinnæ are broadest at the base and attenuated at their extremity, with their edge deeply toothed and their two sides unequal, the upper one being auricled and narrowed suddenly, and the lower one very obliquely truncate at the base. The fronds are of nearly the same breadth throughout, except near the apex, where they suddenly become narrower and terminate in a tail-like appendage, usually bearing one solitary bulbil, or sometimes two, from which the plant may be readily propagated. This species is peculiar also through the boldness of its sori (spore masses), of a bright reddish-brown colour when mature, disposed on either side of and parallel to the midvein, along the whole length of which they form a close double row; besides these, one or more, usually not so bold, are found running longitudinally along the segments and at a slight angle to those near the midvein. The frond illustrated (Fig. 82) is only a partially-developed, barren one; it does not show the tailed appendage which has given this plant its specific name.—*Hooker*, *Species Filicum*, iii., p. 152. *Nicholson*, *Dictionary of*

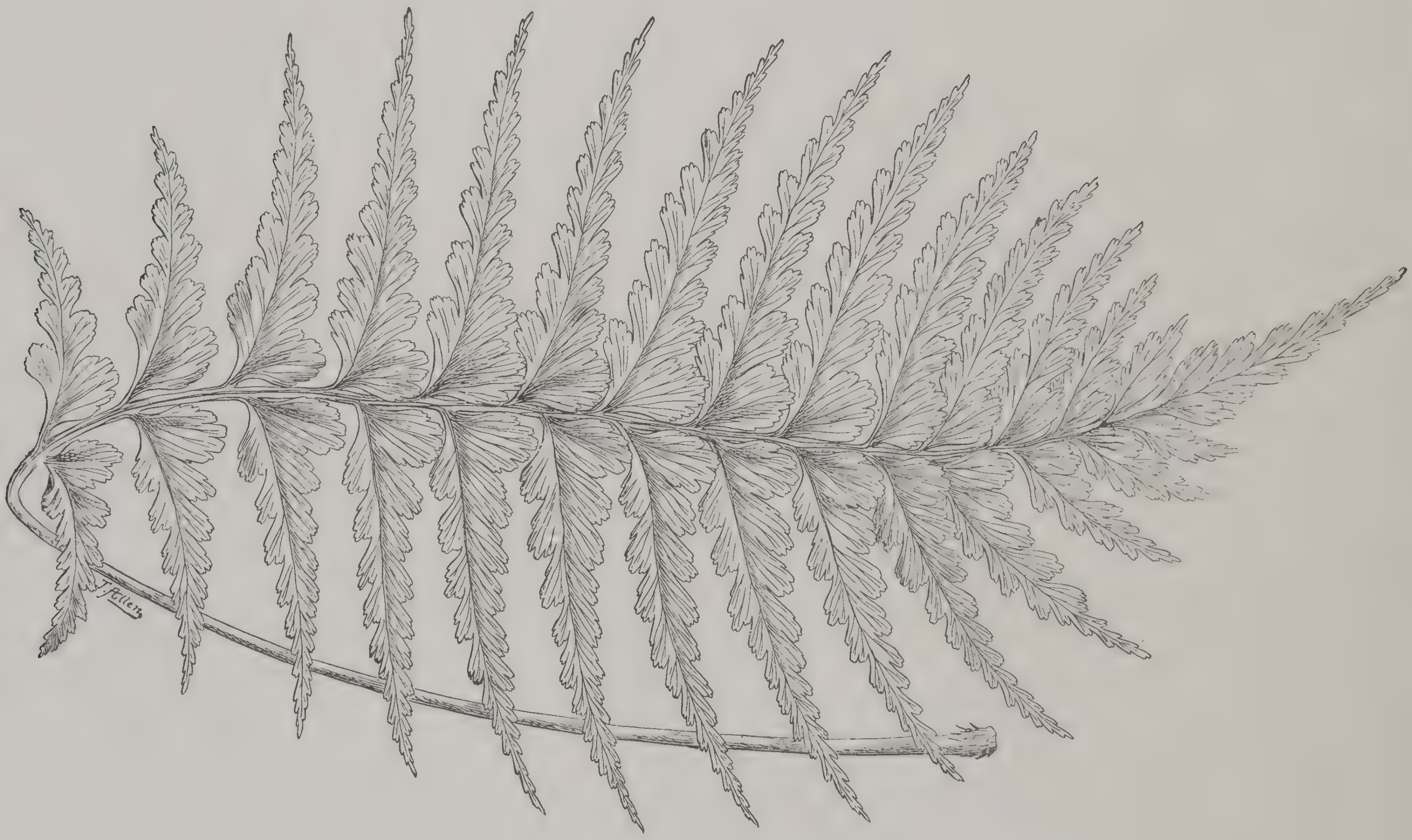


Fig. 82. Partially-developed, Barren Frond of Asplenium caudatum
(⅓ nat. size).

Gardening, i., p. 129. *Lowe, Ferns British and Exotic*, v., t. 44. *Beddome, Ferns of Southern India*, t. 143 (this plate was drawn from a specimen gathered in Ceylon).

A. caudatum is an easily-grown Fern, and on account of the gracefully-pendulous character of its fronds, which are abundantly produced from a succulent and slightly-creeping rhizome (prostrate stem), is very well adapted for growing in hanging baskets of large dimensions. The whole plant is of a beautiful dark, glossy green, which contrasts agreeably with the colour of the conspicuous fructification, and the fronds, being of a coriaceous (leathery) texture, possess the advantage of remaining a long time on the plant. This is one of the few species which prefer a mixture of peat and sand only, without any loam whatever.

A. (**Hemidictyum**) **Ceterach**—He-mid-ic′-tў-um ; Ce′-ter-ach (Ceterach), *Linnæus.*

This species, of dwarf habit, generally known as *Ceterach officinarum*, and popularly called Scaly Ceterach, Scaly Spleenwort, or Scale Fern, is of a very cosmopolitan character, for, besides being essentially a British Fern, it is also known to be indigenous throughout Europe, Northern Asia, British India, &c. In the various popular appellations under which, according to the localities, it is known, its distinguishing name of "scaly" is strictly adhered to, on account of the silvery and brown scales with which the under-surface of its leathery, smooth fronds is thickly clothed ; these scales, which in young fronds have a peculiarly silvery appearance, are permanent and singularly tenacious, but they are limited to the under-surface. The upper surface, which is totally devoid of such scales, is, in the young state, of a glaucous (bluish-green) colour, and shows around the pinnæ (leaflets) a narrow, white edge, forming a pleasing contrast to the dark tint which they assume when mature. The Scale Fern (Fig. 83) is of dwarf growth ; its fronds, 4in. to 6in. long and 1in. or less broad, are cut down nearly or quite to the rachis (stalk of the leafy portion) into alternate (not opposite), blunt, nearly entire, roundish lobes, with a rounded sinus (depression) between them. These fronds are produced in great abundance from a close, central crown, and, although they frequently shrivel up completely during the dry weather, as also during the winter, they spread out afresh as soon as the plant is exposed to a certain degree of moisture. As an example of its extreme tenacity of life, we may here quote a statement made more than a quarter of a century ago by Dr. Daubeny, then Professor of Agriculture at Oxford, and which we find reproduced in "Les Fougères rustiques," the excellent work of Mons. H. Correvon, who says: "A lady in Ireland found among her dry specimens one of *Grammitis Ceterach* (*Ceterach officinarum*), which had been two years in a portfolio in a dry, warm room, and after planting it in a pot and covering it close, she had the satisfaction of seeing it come to life again; first a fresh young frond coming up, after which the plant grew and continued to flourish and develop."—*Hooker*, *Species Filicum*, iii., p. 273. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Our Native Ferns*, ii., t. 57. *Beddome*, *Ferns of Southern India*, t. 143.

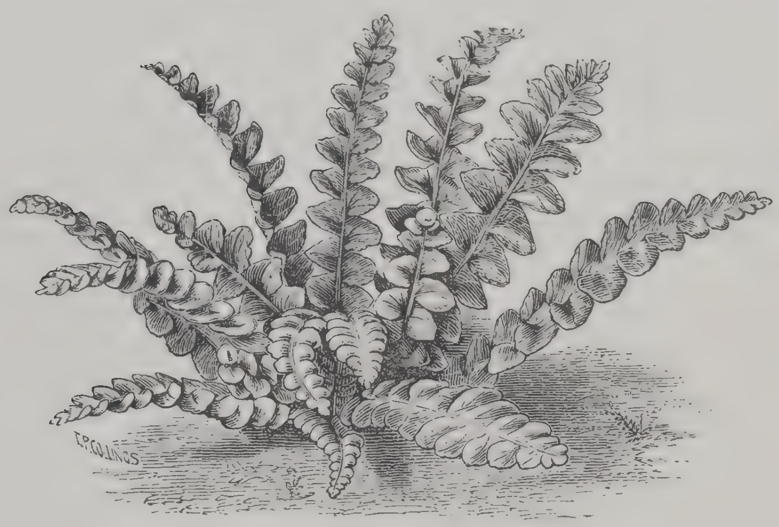


Fig. 83. Asplenium Ceterach
(¼ nat. size).

As a native Fern, *A. Ceterach* is found growing on walls and ruins from the sea-level to an altitude of 600ft. In the first part of his "Herbal," published in 1551, Turner, the first writer who describes it as an English plant, says: "It groweth muche in Germanye, in old moiste walles and in rockes; it groweth also in England about Bristowe (Bristol)." He adds: "I have heard no English name of this herbe, but it maye well be called in English Ceteracke, or Miltwaste, or Finger Ferne, because it is no longer than a manne's finger, or Scale Ferne, because it is all full of scales on the innersyde. It has leaves lyke in figure unto Scolopendra, the beste, which, also called Centipes, is not unlyke a great and rough palmer's worme." Although found in a wild state in most parts of the British Islands, the Scale Fern occurs less frequently in Scotland, where, however, it has been found on Drumlaurig Castle, in Dumfries-shire; on the ruins of Iona, and at Kinnoul Hill, near Perth. In England it has been gathered in counties situated far apart, and in localities which, so far as climate and situation are concerned, have no similarity—such as Settle, in Yorkshire, where it used to grow abundantly; on limestone rocks in Lath Hill Dale and in Dove Dale, in Derbyshire; on walls in quarries at Ludlow, in Shropshire; at Cheddar, Malvern Abbey, and Bath; at Topsham and other places in Devonshire; on the tower of old Arlesford Church, in Hampshire; on an old wall near Cowley, in Oxfordshire; and in many places in Norfolk, Suffolk, Gloucestershire, and Hertfordshire. In fact, it is abundant in the West and North-west of England; whereas in the East it is comparatively rare. It is to this day met with on the walls of a ruin at Treborth, near Bangor; but in Denbighshire and some other parts of Wales, where it was formerly very plentiful, the Scale Fern has become nearly extinct, for, although abandoned as a medicinal plant—its wonderful liver-healing properties being now entirely discarded—it has been largely used as a bait for rock-cod fishing on the coast of Wales. The Rev. Hugh Davies states that, owing to its consumption for that purpose, it has become very scarce about Holyhead, where it once flourished and was found in great abundance. In Ireland, where it is most plentiful, and where it is seen growing most luxuriantly, it has been collected on stone walls, which it completely covers, near Cork and Kilkenny; on the ruins of Saggard Church, on Cave Hill, and at Headford, in Galway. It is also indigenous in Jersey and in the Isle of Wight.

The success in the cultivation of this, one of the prettiest and most interesting of all our native Ferns, depends mostly on the situation in which it is placed. Some sound advice as to its culture, given more than twenty-five years ago, being now as good as it was then, we cannot refrain from quoting therefrom. Mr. Charles Johnson, speaking of *A. Ceterach*, says: "It is not at all easy to cultivate this Fern successfully; it is too impatient of confinement to live long in a greenhouse, and the cold frame, so useful for the protection of other half-hardy species, is almost certain death to this. The metropolitan cultivator is told that London air disagrees with it, and yet the only plant of it I possessed in my early career lived in a nook of an old wall in a back area in Hatton Garden for several years, and may be there still, unless eradicated by repair. Sun never reached it, and ancient mortar, which, through being constantly moist, had somewhat the consistence of paste, probably agreed with its constitution—a very important point to be studied in planting, as when left to its own selection, or in the wild state, it seems universally to prefer a calcareous habitat. Whether planted in the open

Fernery or grown in pots, great care must be exercised as to the drainage, and in the latter case especially to avoid wetting the fronds in watering."

As will be seen by the above quotation, the Scale Fern, which is a true limestone plant, was then thought as difficult of cultivation as it now is. There are exceptions to all rules, and the experience of Mr. C. Johnson as regards his plant growing in Hatton Garden was confirmed later on by no less an authority than Mr. E. J. Lowe, who, in his excellent work "Our Native Ferns," vol. ii., p. 373, says: "The finest plants I have seen have been left to take care of themselves in a damp situation and a close, heavy, clayey soil, where the sun never shines, but exposed to the north. Growing wild they are seldom found except *on the south or sunny side of a wall.*" The plants referred to were then in conditions totally the reverse of those in which the plant is found in its wild state; yet its natural mode of growth should be imitated as far as practicable. It should be planted in a wall among some old mortar; or, if grown in pots, it should be put in a mixture of sandy loam, old lime or mortar rubbish, and limestone, in equal parts, and it will be found to thrive better if the pots, instead of standing in the usual upright position, are kept in a horizontal one, and well above the ground, where no superfluous moisture can collect and remain around the plants.

Several distinct and pretty forms of the Scale Fern have been gathered in a wild state, but few only have retained their distinctive characters under cultivation. The following are the only varieties which have remained distinct when artificially grown:

A. C. aureum—au′-rĕ-um (golden), *Link.*

This charming Fern, also known as *Ceterach canariensis* of Willdenow, and native of Madeira and the Canary Islands, although usually termed a species, is undoubtedly only a large variety of *A. Ceterach;* it differs in its much more vigorous habit and also in the disposition of its beautiful fronds, which are usually produced from a single crown. As is the case in the species, these fronds are pinnatifid (cut nearly to the midrib) and often pinnate at the base; but instead of being from 4in. to 6in. long, they often measure from 1ft. to 1½ft. under cultivation, their pinnæ (leaflets) being deeply lobed and sometimes auriculate (eared) at the base; they are leathery, smooth, and dark green on their upper surface, while their under-side is densely clothed with brown, imbricated (overlapping) scales.—*Hooker*, *Synopsis Filicum*, p. 245. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

Although requiring warmer treatment than the species, *A. C. aureum* is more amenable to cultivation, and will be found to do well in a mixture of three parts sandy peat and one of loam and sand, with small pieces of limestone. When potted in such light material it requires a pretty liberal supply of water at the roots, but the drainage must be perfect.

A. C. crenatum—cre-na′-tum (notched), *Moore*.

A robust variety, known also as *sinuatum* of Kinahan; it is abundantly found in two localities near Clitheroe, namely, Pendle Hill and Browsholme Hall; also in Devonshire; in County Clare, in Blackhead, and in Galway, in Ireland; and at Kinnoul Hill, near Perth, in Scotland. Its fronds, otherwise normal, are larger than those of the species, from which it also differs in having the margins of its round-toothed lobes deeply crenate and often appearing as though slightly twisted towards the back of the frond. A form of this Fern called *crenatum minor* differs only in being smaller than the normal form, with a margin equally notched.—*Lowe*, *Our Native Ferns*, ii., p. 373.

A. C. depauperatum—de-pau-per-a′-tum (impoverished), *Wollaston*.

A variety more curious than beautiful, found growing wild at Kilkenny. Its fronds, of normal size, are extremely variable in shape, some being bifurcate (twice forked) at their extremity, others acuminate (taper-pointed), while in some other cases they are quite cornute (ending in a short horn-like projection). But whatever their form may be, the segments are so depauperated as to be almost wanting, the fronds having all the appearance of a sinuately-winged rachis (stalk).—*Lowe*, *Our Native Ferns*, ii., p. 374.

A. C. Kalon—Kal′-on (Kalon), *Lowe*.

This, no doubt, is the handsomest known form of British origin, and the one which, in point of size and beauty, approaches nearest to *A. C. aureum* of Link. Its fronds, 8in. or more in length and fully 1½in. broad in their widest part, are furnished with large pinnæ (leaflets), which are rounded at their summit, and show conspicuous, projecting, crenate lobes.—*Lowe*, *Our Native Ferns*, ii., p. 374, fig. 782.

A. C. ramoso-cristatum—ra-mo′-so–cris-ta′-tum (branched and crested), *Lowe.*

This most extraordinary form, of larger dimensions than the typical species, was originally found wild in Ireland, and transplanted in a rockery at Woodcote, near Warwick, where it grows luxuriantly. Its fronds (Fig. 84), which, including the stalks, are 8in. or more long, are branching and much divided at their extremity, and occasionally crested as well; the leaflets are variable in size and form, being divided nearly or quite to the midrib.—*Lowe, Our Native Ferns*, ii., p. 375, figs. 783 and 784.

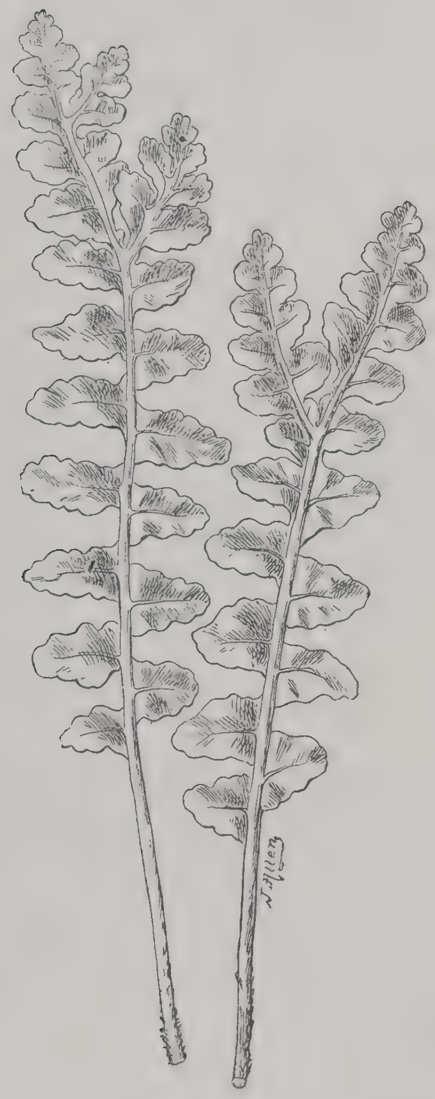


Fig. 84. Fronds of Asplenium Ceterach ramoso-cristatum (½ nat. size).

A. C. ramosum—ra-mo′-sum (branched), *Moore.*

A dwarf form, with fronds only about 2in. long, divided in two about half-way up, when each branch resembles a small normal frond, occasionally spread upwards and with the margin scarcely divided. It was found growing wild at Ilfracombe.—*Lowe, Our Native Ferns*, ii., p. 373.

A. C. variabile—var-ĭ-a′-bil-ĕ (variable), *Lowe.*

This very singular, lax form was originally found at Browsholme Hall, Lancashire. Its fronds, about 5in. long, are furnished with very variable pinnæ (leaflets): some are entire (uncut), others are distinctly, though irregularly, toothed, while others again are variously shaped.—*Lowe, Our Native Ferns*, ii., p. 374, fig. 781.

A. (Anisogonium) chimborazense—chim-bor-az-en′-sĕ (a native of Chimborazo), *Spruce.*

This stove Fern, native of Chimborazo, where it is found wild at elevations of between 3000ft. and 4000ft., is one of the strongest-growing kinds known in the whole genus. Its fronds, fully 6ft. long and 2½ft. broad, are borne on brown, angular stalks 3ft. long and ½in. thick at the base, where they are densely clothed with large, spear-shaped, brown scales; they are furnished with fifteen or sixteen pairs of pinnæ (leaflets), the lowest of which are quite 1¼ft. long by 2½in. broad, their extremity suddenly terminating in a sharp point, and their edge being slightly undulated. All the portions of the frond are of a thin yet sub-coriaceous (almost leathery) texture, and the sori (spore masses) are disposed in slender lines reaching about two-thirds of the way to the edge of the fertile pinnæ.—*Hooker*, *Synopsis Filicum*, p. 244.

A. (Diplazium) chinense—Dip-laz′-ĭ-um; chi-nen′-sĕ (from China), *Baker.*

A greenhouse species, native of Shanghai, China, with fronds 1ft. to 1¼ft. long and nearly as broad, borne on slender, nearly naked stalks about 1ft. long and of a greyish colour. These fronds are bipinnate (twice divided to the midrib) all the way through, except just at their summit, where they are only pinnatifid (cut part of the way to the midrib). The pinnæ (leaflets), of a thin, papery texture and long-stalked, are 3in. to 5in. long and 2½in. broad, and are divided into close, lanceolate pinnules (spear-shaped leafits), which in their turn are subdivided into deeply-toothed, oblong segments about 1¼in. long. The long and narrow sori (spore masses) do not reach the edges of the pinnules.—*Hooker*, *Synopsis Filicum*, p. 237.

A. (Euasplenium) cicutarium — Eu-as-ple′-nĭ-um; cic-u-ta′-rĭ-um (Cicuta-leaved), *Swartz.*

This very pretty, delicate-looking, stove Fern, common in the West Indies, Mexico, and South America, is also, according to Eaton, a native of Florida, where it is found in a wild state on calcareous rocks, near Lake Panasofkee, in Sumter County, where it is known under the name of the Hemlock Spleenwort. Its lovely fronds, 6in. to 15in. long and 4in. to 6in. broad, are borne on firm, smooth, greenish stipes (stalks) 4in. to 8in. long, provided on each side with a narrow, paper-like wing, which is continued all along the stalk of the leafy portion to the tips of the fronds.

These fronds are disposed shuttlecock-fashion on the summit of a short caudex (stem), which Plumier, who found this plant in almost every place he visited in the American Islands, in describing it in his "Traité des Fougères de l'Amérique," p. 14, says: "La racine de cette Fougère est toute chevelue, par quantité de petites fibres grisâtres et longues de deux à trois pouces, d'où sortent quatre ou cinq pédicules ou costes menues, rondes, d'un vert sale et d'environ un pied" (the root of this Fern is entirely hairy on account of a quantity of small greyish fibres 2in. to 3in. long, from among which emerge four or five pedicles or fine round stalks, of a dirty green colour and about 1ft. long). The "racine" which he mentions is evidently the rootstock or caudex, and the "greyish fibres" are undoubtedly rootlets

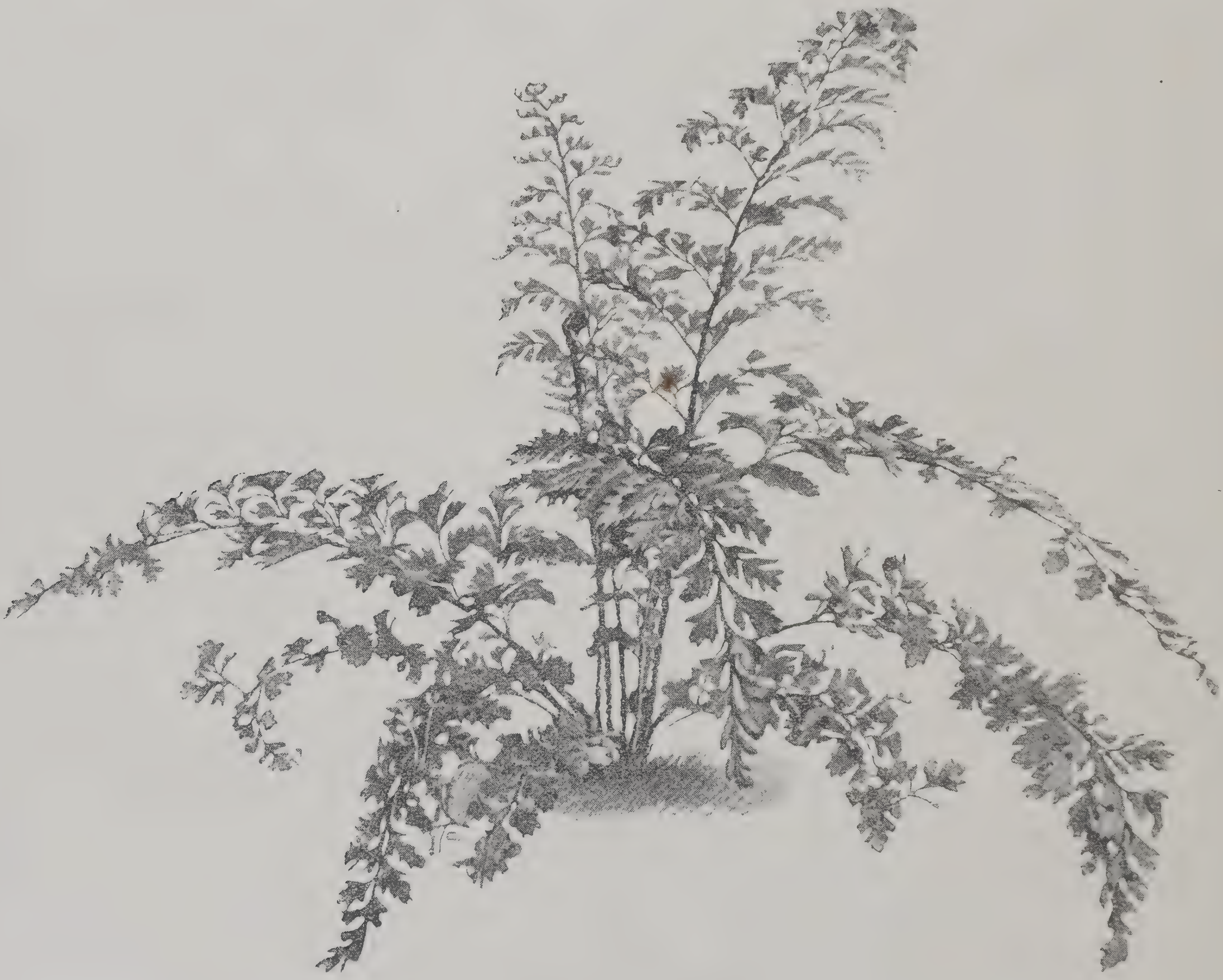
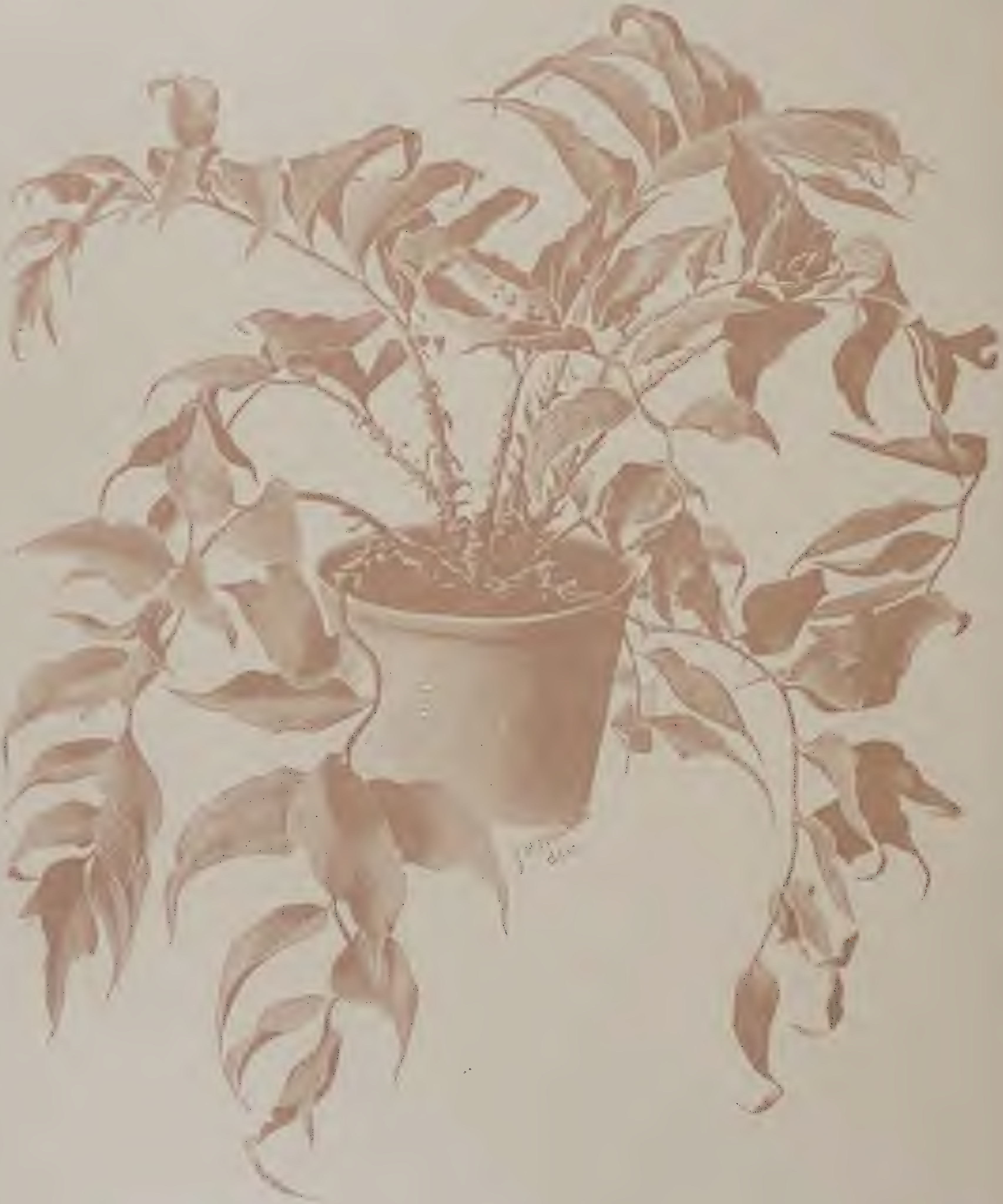


Fig. 85. Asplenium Colensoi
(⅓ nat. size).



Aspidium falcatum pendulum

(¼ nat. size).

forming it. The fronds are smooth, of a bright green colour and thin, papery texture, lanceolate (spear-head-shaped), and composed of from ten to fifteen pairs of pinnæ (leaflets) 2in. to 3in. long at the middle part of the frond, whence they gradually decrease in size to the usually acuminate (tapering) extremity. These leaflets are closely placed ; they are generally oblong-spear-shaped and tripinnatifid (three times divided half-way to the midrib), but more commonly only twice divided in that way, thus forming segments once or twice cleft at their summit. The sori (spore masses) are elongated and disposed principally in two rows on the upper side of each fertile pinnule (leafit).—*Hooker*, *Species Filicum*, iii., p. 191. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Ferns British and Exotic*, v., t. 20. *Eaton*, *Ferns of North America*, ii., t. 56.

A. (Euasplenium) Colensoi—Eu-as-ple′-nĭ-um ; Col-en′-sŏ-i (Bishop Colenso's), *Hooker.*

This very useful and elegant, greenhouse species (Fig. 85), native of New Zealand, is also frequently found in the trade under the erroneous name of *A. Hookerianum*, which is properly applied to a plant of entirely different appearance. The species dedicated to Bishop Colenso is much in the way of the well-known *A. bulbiferum*, but of more compact habit and of much smaller dimensions in all its parts. As in that popular species, the fronds, 6in. to 9in. long, 2in. to 4in. broad, and borne on stalks 3in. to 4in. long and clothed throughout with small scales, are produced in abundance from a thick, fleshy crown ; they are of a bright pale green colour and soft texture. The numerous pinnæ (leaflets) are divided into spreading and deeply-cut pinnules (leafits) ; these in their turn are subdivided into narrow segments, each of which bears a solitary sorus (spore mass). When fully developed, the fronds are literally studded all over with young plants, by which means this species is usually propagated.—*Hooker*, *Synopsis Filicum*, p. 219. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

A. (Euasplenium) compressum—Eu-as-ple′-nĭ-um ; com-pres′-sum (compressed), *Swartz.*

This greenhouse species, native of the Island of St. Helena, is a thick, fleshy-looking Fern, very different in appearance to any other known

Asplenium. It is the same plant which, in Continental collections, is to be found under the name of *A. fœcundum*, and it is well worth growing for the diversity of its foliage. The thick fronds, 2ft. to 3ft. long and 8in. to 12in. broad, are borne on stout, erect, green stipes (stalks) 6in. to 8in. long and clothed in the lower part with dark brown scales; the crown from which they are produced is also entirely covered with similar scales. These fronds

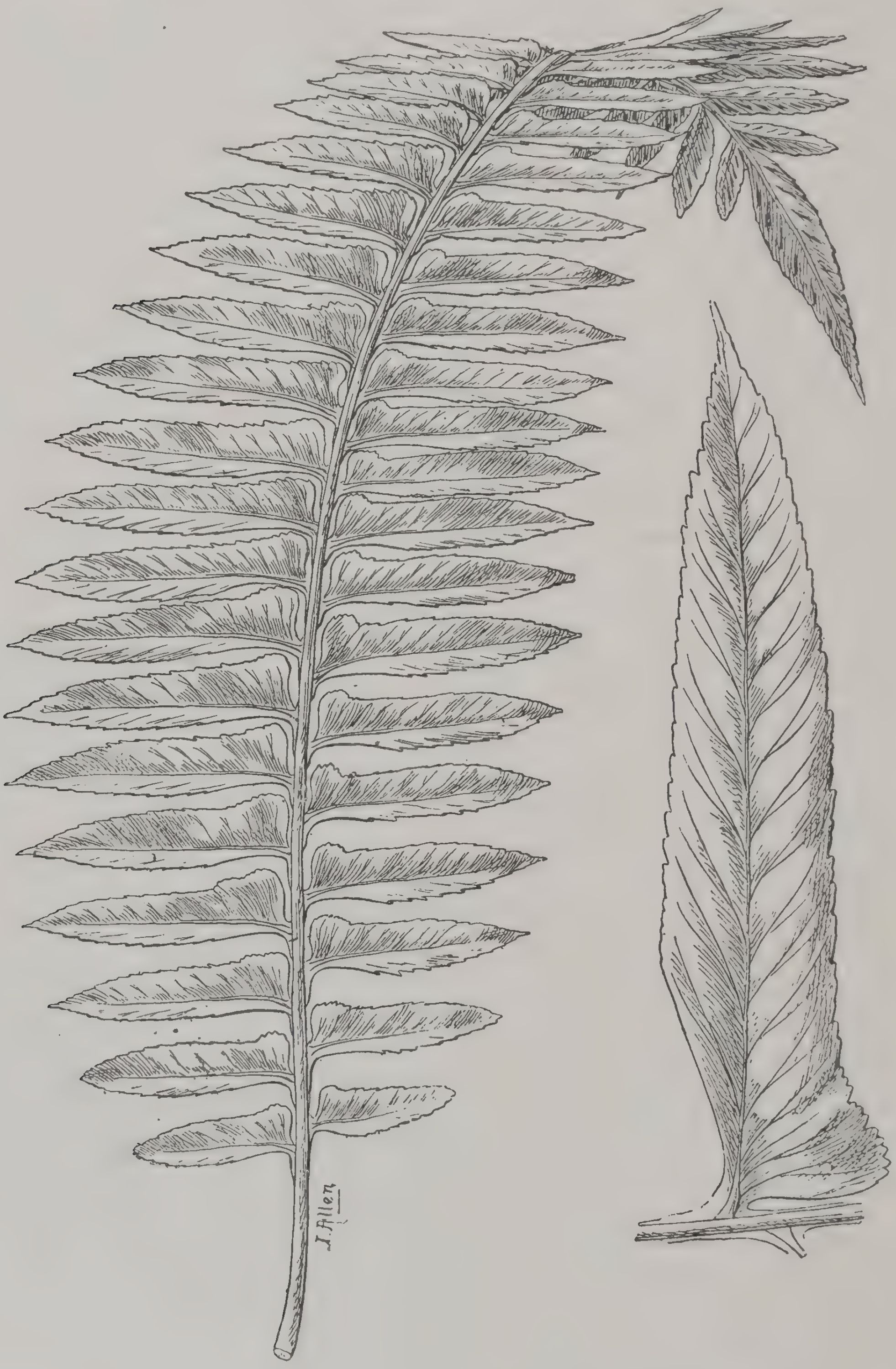


Fig. 86 Frond and Pinna of Asplenium compressum
(Frond, ¼ nat. size; Pinna, nearly nat. size).

are simply pinnate (only once divided to the midrib), oblong-spear-shaped, and composed of from ten to twenty pairs of sessile pinnæ (stalkless leaflets) 4in. to 6in. long, 1in. broad, bluntish at the point, slightly toothed, and often proliferous (bud-bearing) all over their upper surface; the upper pinnæ are decurrent (running down) upon the stout, compressed, fleshy stalk, the upper side being narrowed suddenly at about a right angle and the lower one obliquely truncate (Fig. 86). The broad and distant sori (spore masses) do not reach either the midrib or the edge.—*Hooker*, *Species Filicum*, iii., p. 121. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Ferns British and Exotic*, v., t. 16.

A. (Euasplenium) contiguum—Eu-as-ple′-nĭ-um ; con-tig′-ŭ-um (contiguous), *Kaulfuss.*

A greenhouse species, in the way of *A. falcatum*, native of the Sandwich and Philippine Islands, also of the Anamallay Hills and the Neilgherries, where, according to Beddome, it grows at elevations of 3000ft. and 7000ft. It is a distinct and very interesting Fern, with fronds 1ft. to 1½ft. long, 4in. to 6in. broad, borne on firm, erect, smooth stalks of a peculiar chestnut-brown colour and 6in. to 9in. long. The pinnæ (leaflets), from twenty to thirty on each side of the rachis, are sub-falcate (almost sickle-shaped), terminating in a long, tapering point, and with the edge more or less, sometimes deeply, cut and slightly lobed, the base being narrowed suddenly and sometimes auricled (eared) on their upper side; they are of a sub-coriaceous (almost leathery) texture, and their basal lobes are wedge-shaped and unequally toothed at their extremity. The closely-set and abundant sori (spore masses) fall considerably short of the margin; in fact, they are contiguous and disposed parallel with the midrib.—*Hooker*, *Species Filicum*, iii., p. 156, t. 194. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *New and Rare Ferns*, t. 16. *Beddome*, *Ferns of Southern India*, t. 140.

A. (Anisogonium) cordifolium—An-is-og-o′-nĭ-um ; cor-dif-ol′-ĭ-um (having heart-shaped fronds), *Mettenius.*

A stove species, of small dimensions, native of the Philippine and Malay Islands, with fronds 8in. to 12in. long, 3in. to 4in. broad, and of a singular shape for an Asplenium: they are entire (uncut) and heart-shaped at the base, and their apex ends in a long, tapering point. They are of a coriaceous (leathery) texture and borne on firm, erect stalks 6in. to 12in. long and scaly below. The sori (spore masses) extend from the midrib to the edge.—*Hooker*, *Species Filicum*, iii., p. 267.

A. (Euasplenium) coriaceum — Eu-as-ple′-nĭ-um ; cor-ĭ-a′-cĕ-um (leathery), *Baker.*

A stove species, of small dimensions, native of the Cameroon Mountains. Its fronds, 9in. to 12in. long and 1½in. broad, have a firm, compressed, winged rachis (stalk of the leafy portion) 2in. to 3in. long and gradually narrowed below into the winged stalk ; their texture is very coriaceous (leathery) and their edge is nearly entire or smooth. The sori (spore masses) are generally ½in. long, are situated a little apart from one another, and occupy a very oblique position.—*Hooker*, *Synopsis Filicum*, p. 192.

A. (Athyrium) crenatum—Ath-yr′-ĭ-um ; cre-na′-tum (having convex, flat teeth), *Ruprecht.*

This is a greenhouse species, native of Scandinavia, Siberia, and Japan. Its fronds, 9in. to 15in. long and of about equal breadth, are borne on firm, erect, straw-coloured stipes (stalks) 6in. to 12in. long and clothed towards the base with large, ovate (egg-shaped) scales of a peculiar dark brown colour. The leafy portion is deltoid (in form of the Greek delta, Δ), tri- or quadripinnatifid (three or four times divided half-way to the midrib), and provided with from nine to twelve leaflets on each side of the stalk, the lowest of which are much the largest ; these leaflets are divided into lanceolate pinnules (spear-shaped leafits), which in their turn are cut down nearly to the rachis (stalk of the leafy portion), except towards the point, on each side into four to six blunt, oblong segments, of a soft, papery texture and bluntly toothed. The sori (spore masses), two to six to each fertile segment, are oblong, usually nearly straight, and often double.—*Hooker*, *Species Filicum*, iii., p. 226. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

A. (Diplazium) crenulatum—Dip-laz′-ĭ-um ; cre-nu-la′-tum (having small, convex teeth), *Baker.*

A strong-growing, stove species, of nearly arborescent habit, native of Cuba, Mexico, Brazil, and Ecuador. The fronds, which are produced from an erect caudex (stem) and borne on firm, erect stipes (stalks) 1ft. to 1½ft. long and hardly scaly below, are from 2ft. to 3ft. long and 9in. to 15in. broad, and are provided on each side of the central stalk, below the pinnatifid point, with fifteen to twenty pinnæ (leaflets) 6in. to 8in. long and 1¼in. broad, which are cut half or two-thirds of the distance to the rachis (stalk of the leafy portion) into slightly-toothed, oblong lobes or segments. The sori (spore masses) are about ½in. long and disposed close to the midvein of each fertile segment.—*Hooker*, *Synopsis Filicum*, p. 236.

A. (Euasplenium) crinicaule—Eu-as-ple′-nĭ-um ; cri-nic-au′-lĕ (having hairy stalks), *Hance.*

This stove species, native of China, Sikkim, and the Neilgherries, is the plant described by Beddome in his "Ferns of Southern India," t. 141, as *A. falcatum;* but it is totally different from the true *A. falcatum* of Lambert. It is also called *A. Beddomei.* The fronds of *A. crinicaule*, 6in. to 9in. long and 1½in. broad, are borne on erect stalks 3in. to 4in. long and slightly covered with dark brown hairs. There are on each side of the stalk fifteen or more horizontal, sub-coriaceous pinnæ (almost leathery leaflets), with bluntish points and edges irregularly crenated (notched), the upper side narrowed suddenly and sometimes auricled at the base, the lower obliquely truncate (Fig. 87). The sparingly-produced sori (spore masses) are linear (long and narrow) and very oblique.—*Hooker*, *Synopsis Filicum*, p. 208.

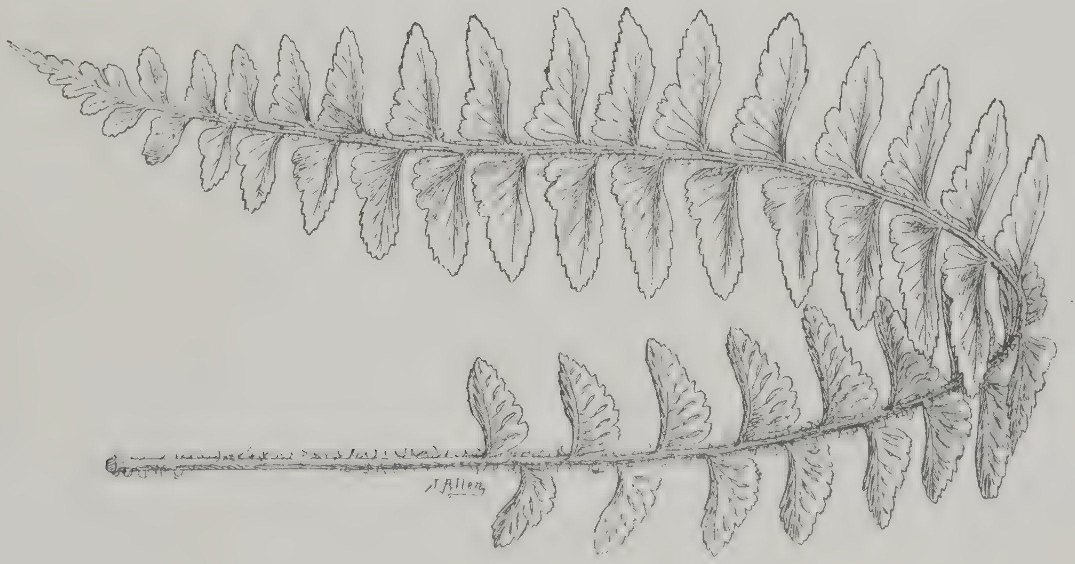


Fig. 87. Frond of Asplenium crinicaule
($\frac{2}{3}$ nat. size).

A. (Euasplenium) cultrifolium — Eu-as-ple′-nĭ-um ; cul-trif-ol′-ĭ-um (hook-leaved), *Linnæus.*

This stove species, which is commonly, though erroneously, called *Diplazium cultrifolium*, is a native of the West Indies, where it appears to be very abundant. Its fronds, 6in. to 12in. long and 4in. to 6in. broad, are borne on naked, greyish stipes (stalks) 4in. to 6in. long; they have on each side of the rachis (stalk of the leafy portion) six to ten leaflets, which are 3in. to 4in. long, with a sharp point, broadly toothed, and of a thin, papery texture. The sori (spore masses) fall short of both the edge and the midrib.—*Hooker, Species Filicum*, iii., p. 110. *Nicholson, Dictionary of Gardening*, i., p. 129.

A. (Euasplenium) cuneatum—Eu-as-ple′-nĭ-um ; cun-ĕ-a′-tum (wedge-shaped), *Lamarck.*

This is a very handsome, stove species, of wide distribution, for it is found in a wild state in Tropical America, in the West Indies, in the Polynesian Islands, in China, in Cape Colony, &c. Its fronds, 6in. to 15in. long and 6in. to 9in. broad, are borne on firm, erect, naked stipes (stalks) 6in. to 9in. long; they are provided on each side of the rachis (stalk of the leafy portion) with numerous pinnæ (leaflets) of a somewhat coriaceous (leathery) texture, the lower ones 3in. to 4in. long, 1½in. broad, cut down to the midrib into several distinctly wedge-shaped pinnules (leafits), which are toothed and cut down in the lower part nearly or quite to the rachis (stalk of the leafy portion). The sori (spore masses) are linear (long and very narrow).—*Hooker, Species Filicum*, iii., p. 168. *Nicholson, Dictionary of Gardening*, i., p. 129.

A. (Euasplenium) Currori — Eu-as-ple′-nĭ-um ; Cur-ror′-i (Curror's), *Hooker.*

A stove species, native of the Guinea Coast, with quite entire (undivided) fronds of a coriaceous (leathery) texture, 1ft. to 1½ft. long, 1½in. broad at their widest part, narrowed gradually to a tapering point, but suddenly at the base, and with the margin slightly undulated. The sori (spore masses) do not reach either the midrib or the margin.—*Hooker, Species Filicum*, iii., p. 82.

A. (Diplazium) cyatheæfolium—Dip-laz′-ĭ-um; cy̆-ath′-ĕ-æ-fol′-ĭ-um (Cyathea-leaved), *Bory.*

A stove species, native of Luzon and New Guinea, producing from a somewhat arborescent caudex (stem) fronds 1½ft. to 2ft. long and 1ft. to 1½ft. broad; these are borne on firm, erect, dark brown, nearly naked stipes (stalks), and are furnished with numerous pinnæ (leaflets), the lowest of which are fully 9in. long by 3in. broad. The leaflets are divided into numerous pinnules (leafits), the lower ones being again cut down one-third of the distance to the rachis (stalk of the leafy portion) into oblong, falcate (sickle-shaped), sharply-toothed lobes, of a thin, papery texture. The sori (spore masses), situated near the midvein, fall considerably short of the edge. —*Hooker*, *Synopsis Filicum*, p. 238.

A. (Euasplenium) Dalhousiæ—Eu-as-ple′-nĭ-um; Dal-hou′-sĭ-æ (Lady Dalhousie's). Synonymous with *A. alternans.*

A. (Darea) davallioides—Da′-rĕ-a; dav-al′-lĭ-ŏ-i′-dēs (Davallia-like), *Hooker.*

This greenhouse species, native of Japan, Tsus-Sima, and Hong-Kong, is, of all known Aspleniums, that which comes nearest to the genus *Davallia.* It is a very pretty little plant, of small dimensions, its fronds, borne on firm, naked stipes (stalks) from 3in. to 4in. long, seldom attaining more than 6in. in length and 3in. in breadth. They are quadripinnate (four times divided to the midrib) and bear on each side of the rachis (stalk) from six to nine leaflets of a thick, leathery texture, the lowest of which are much the largest, 2in. to 3in. long and 1in. to 1½in. broad. Like the bright green pinnules (leafits) into which these pinnæ are subdivided, they are deltoid (in shape of the Greek delta, Δ) and are provided with a broadly-winged rachis. The abundant sori (spore masses) occupy a lateral position; they are oblong in form, and often cover the whole upper side of the ultimate divisions.—*Hooker*, *Species Filicum*, iii., p. 212.

A. (Euasplenium) decurrens—Eu-as-ple′-nĭ-um; de-cur′-rens (decurrent), *Baker.*

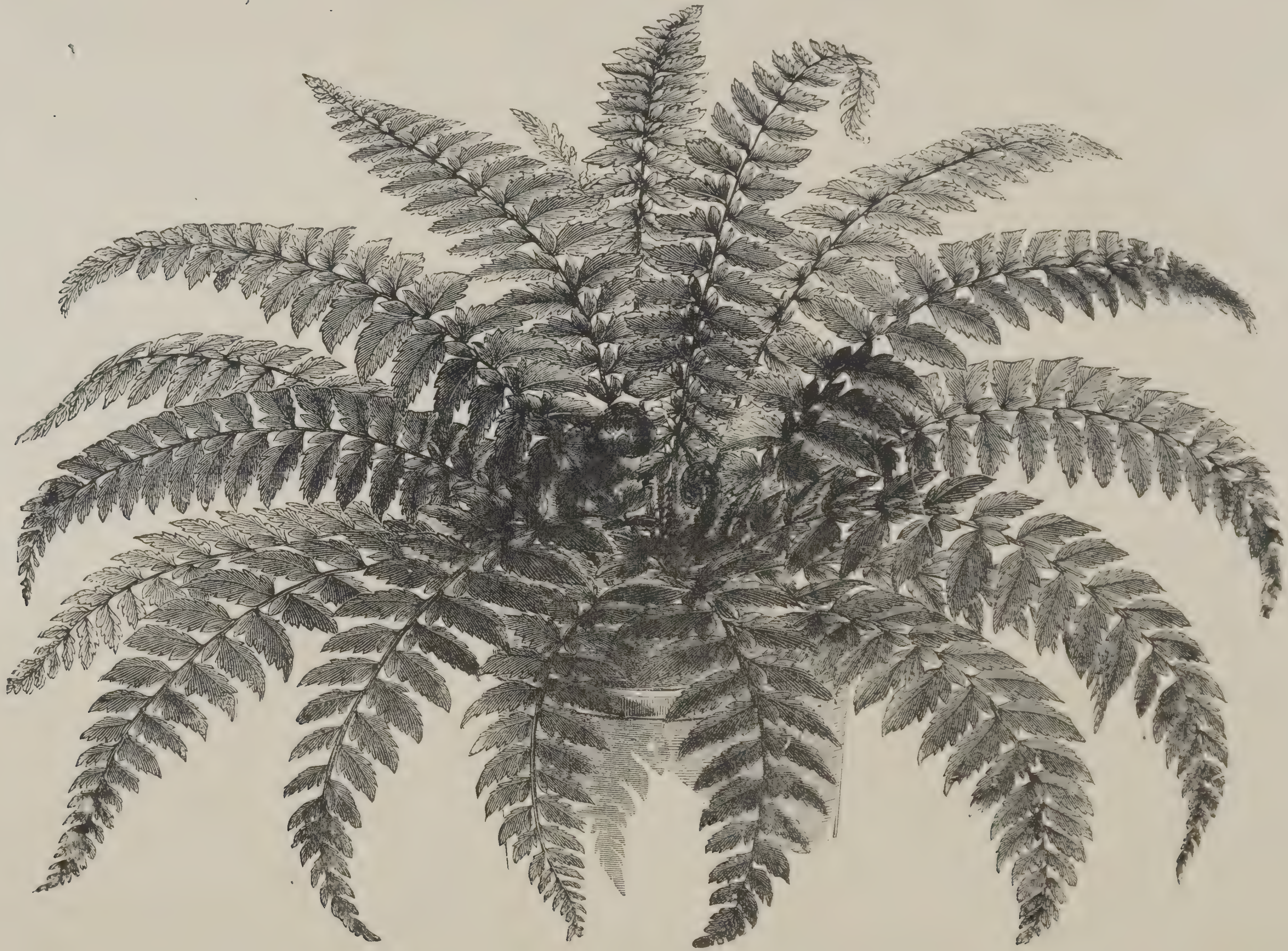
A stove species, native of Samoa and Ceylon, with fronds 1¼ft. to 1½ft. long, borne on short, grey, naked stalks; they are oblong-spear-shaped and furnished with five or six pairs of pinnæ (leaflets), of a firm, parchment-like texture, dark green on both surfaces, and proliferous (bud-bearing) at their extremity. These pinnæ affect a singular and unusual disposition, inasmuch as they are adnate (attached to the stalk through the whole length of their lower base), nearly or quite free and rounded on the upper side at their base, and crenulate (dented) in the upper half of their length. The sori (spore masses), situated close to the midvein or rarely prolonged on either side of it, are disposed in two rows running parallel all the way.—*Hooker*, *Synopsis Filicum*, p. 484. *Beddome*, *Ferns of Southern India*, t. 229.

A. (Athyrium) decurtatum—Ath-yr′-ĭ-um; de-cur-ta′-tum (shortened), *Link.*

An evergreen, stove species, native of Brazil, having very much the appearance of a deciduous Lady Fern. Its fronds, of a soft, papery texture, 2ft. to 3ft. long and 9in. to 12in. broad, are borne on erect, whitish or pale straw-coloured stipes (stalks) 1ft. or more long and scaly at the base; they are bipinnate (twice divided to the midrib), spear-shaped, and furnished with numerous closely-set, spreading leaflets 4in. to 6in. long and 1in. broad, cut down nearly to the rachis (stalk of the leafy portion) into blunt, entire lobes, pubescent (slightly hairy) on both surfaces. The oblong sori (spore masses) fall short of both the edge and the midrib, and the lower ones are curved.—*Hooker*, *Species Filicum*, iii., p. 226. *Lowe*, *Ferns British and Exotic*, v., t. 45.

A. (Anisogonium) decussatum — An-is-og-o′-nĭ-um; dec-us-sa′-tum (decussate or cut crosswise), *Swartz.*

A stove species, of somewhat gigantic dimensions, found in the Polynesian and Malayan Islands, also in Queensland and on the Guinea Coast. Beddome says that it is also a native of Ceylon, as well as of the Tinnevelly Hills, Himalayas. Its fronds, from 2ft. to 4ft. long, are borne on strong, erect stipes (stalks) 1ft. to 2ft. long and often muricated (rough with short tubular excrescences); the midrib is furnished with numerous pinnæ (leaflets) on each side (Fig. 88), which are from 6in. to 12in. long, 1in. to 2in. broad, often proliferous (bud-bearing) in the axils, and with their edge nearly entire or slightly lobed. The sori (spore masses) reach nearly



Aspidium viviparum

(⅙ nat. size).

to the edge and are copiously double.—*Hooker*, *Species Filicum*, iii., p. 270. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Beddome*, *Ferns of British India*, t. 292.

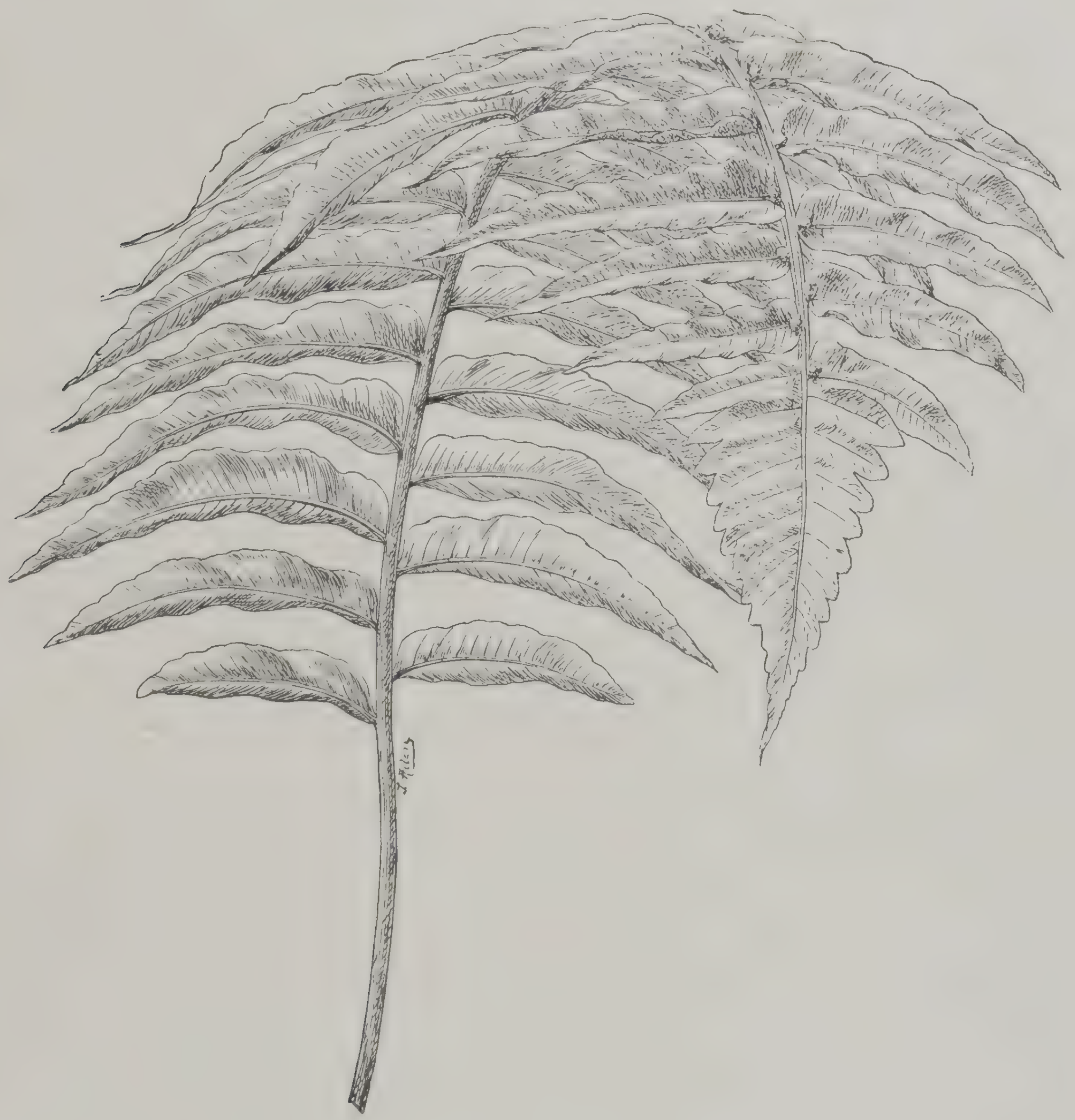


Fig. 88. Frond of Asplenium decussatum
(much reduced).

A. (Euasplenium) dentatum—Eu-as-ple′-nĭ-um ; den-ta′-tum (toothed), *Linnæus*.

This stove species, native of the West Indies and Tropical America, is also very common in some parts of North America, where Eaton says it is called the Toothed Spleenwort, and is found in holes and crevices of lime-rock in a hummock at Miami, Florida, and also in Carolina in similar situations. Dr. Garber, who first discovered it there, says: "Like the other small species of the genus, it grows out of the crevices of lime-rock, and sometimes by the close grouping of the little tufts covers the entire face of shaded rocks; but instead of being found on the sides of rocky ledges like the Northern species, it is restricted to rocky sides of depressions of rock-holes lower than the surrounding surfaces." The fertile and the barren fronds, though of similar shape, are very distinct in size, as the barren ones are much smaller and borne on shorter stalks than the fertile ones. These latter, 2in. to 3in. long and 1in. broad, are borne on stalks 2in. to 6in. long, of a slender nature, smooth and blackish below, and the upper part of which is flattened and green, much as in *A. viride;* they are composed of from six to eight pairs of stalked leaflets and a terminal one, obtuse, but often as large as any other. The leaflets are roundish in the barren fronds and oblong-ovate (egg-shaped) in the fertile ones, and have their outer edge irregularly notched. The sori (spore masses), copiously produced and oblong in shape, are disposed four to eight to each pinna in two parallel rows nearer the midvein than the margin; the basal superior one is often double. —*Hooker*, *Species Filicum*, iii., p. 130. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Eaton*, *Ferns of North America*, ii., t. 80.

A. (Darea) dichotomum — Da′-rĕ-a; dich-ot′-om-um (dichotomous or repeatedly divided in two), *Hooker*.

A stove species, of small dimensions, native of Borneo, with fronds 3in. to 4in. long and 1¼in. broad, oblong, and borne on firm, erect, greenish stalks only about 1in. long. They have from eight to twelve pairs of leaflets, of a soft, papery texture, which are cut down to a compressed, narrow stalk; the lower pinnules (leafits) are again divided into two segments, each of which when fertile bears a solitary sorus (spore mass), long and very narrow, and situated quite on the margin.—*Hooker*, *Species Filicum*, iii., p. 210.

A. (Euasplenium) dimidiatum — Eu-as-ple′-nĭ-um; di-mid-ĭ-a′-tum (unequal-sided), *Swartz*.

This very pretty, stove species, of medium growth, is a native of Cuba and Peru. Its fronds, 6in. to 15in. long and 4in. to 6in. broad, are borne on firm, erect, blackish stalks of a somewhat scaly nature. They are composed of from six to eight pairs of simple pinnæ (undivided leaflets), of a leathery texture, oblong in shape, slightly imbricated (overlapping), sharply toothed, and attached to the stem by a short footstalk situated at their base, which is wedge-shaped. The long and very narrow sori (spore masses) are disposed in an oblique line on each side of the midvein.—*Hooker, Species Filicum*, iii., p. 159. *Nicholson, Dictionary of Gardening*, i., p. 129. *Lowe, Ferns British and Exotic*, v., t. 13.

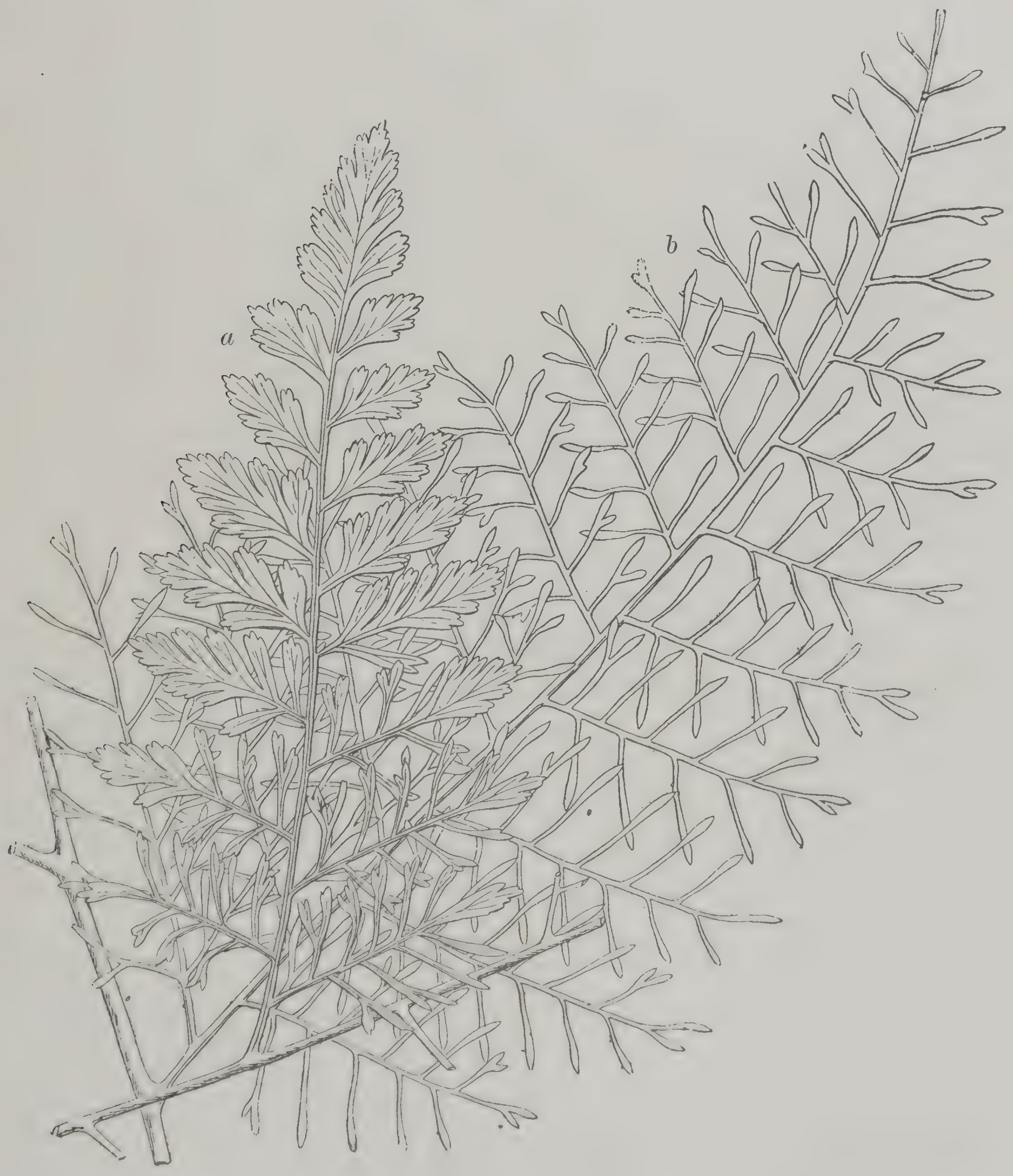


Fig. 89. Pinnæ of two Fronds of Asplenium dimorphum, showing different forms
(*a*, ½ nat. size; *b*, nat. size).

A. (Darea) dimorphum—Da′-rĕ-a; dim-orph′-um (two-formed), *Kunze*.

This very handsome, greenhouse Fern, native of Norfolk Island, is undoubtedly one of the most elegant of the whole genus, and is also known in commerce under the names of *A. biforme* and *A. diversifolium*. These significant synonyms are very applicable to a species whose barren and fertile fronds or portions of fronds are so entirely different that, unless seen growing upon the plant, it is difficult to reconcile the two as belonging to the same subject, the one having the pinnules (leafits) narrow and thread-like, while in the other they are broad and not unlike the leaf of a celery-plant on a small scale (Fig. 89). The gracefully-arching fronds of this noble-growing kind, 2ft. to 3ft. long and quite 1ft. broad, are borne on firm yet flexible stalks 6in. to 12in. long, green above and blackish below; they are produced very abundantly from a fleshy, slowly-creeping rhizome, which invariably keeps on the surface of the ground, are of a shining bright green colour, and bipinnate (twice divided to the midrib). The lower leaflets, somewhat egg-shaped, 6in. to 8in. long and 2in. broad, are furnished with pinnules which, when barren, are 1in. or more long and fully ½in. broad, bluntly toothed, and having the base on the lower side obliquely truncate. Both barren and fertile fronds are of the same size, but the latter are cut down to the rachis into narrow, simple or forked segments. *A. dimorphum* is a remarkably variable species, having its fronds sometimes all fertile, sometimes all barren, while it is not at all unusual to find that the lower portion of a frond is barren while the upper part of it is fertile. It is a plant of exceptionally good constitution and very proliferous, producing on the upper surface of its fronds numerous small bulbils, by which means it is usually propagated. The sori (spore masses), single on each pinnule, are situated on the inner edge and very long, occupying generally three-fourths of the length of the pinnule.—*Hooker*, *Species Filicum*, iii., p. 213. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Ferns British and Exotic*, v., t. 17.

A. diplazioides — dip-laz-ĭ-ŏ-i′-des (Diplazium-like). Synonymous with *A. Arnottii.*

A. (Euasplenium) divaricatum — Eu-as-ple′-nĭ-um; di-va-ric-a′-tum (divaricate, branching off at an obtuse angle), *Kunze.*

A stove species, of small dimensions, native of Chili and Peru, with fronds seldom more than 6in. long, 2in. broad, and borne on very short stalks; they are furnished with numerous closely-set, almost overlapping pinnæ (leaflets), which are in their turn cut into numerous pinnules (leafits) of a parchment-like texture, not more than one line broad and with smooth edges. The sori (spore masses) are solitary at the base of each pinnule.—*Hooker, Species Filicum*, iii., p. 204.

A. (Euasplenium) divergens—Eu-as-ple′-nĭ-um; di-ver′-gens (divergent), *Mettenius.*

This is a stove species, native of Brazil and Ecuador, which, though attaining medium dimensions, is of very little decorative value, its very leathery fronds possessing no particularly distinctive characters.—*Hooker, Species Filicum*, iii., p. 183.

A. diversifolium—di-ver-sif-ol′-ĭ-um (having fronds of different forms). A garden synonym of *A. dimorphum.*

A. (Darea) Dregeanum—Da′-rĕ-a; Dre-gĕ-a′-num (Drege's), *Kunze.*

This stove species, native of Natal, is one of the few Aspleniums that root at the extremity of the fronds. It has the same flaccid character and habit as *A. brachypteron*, with which it is regarded by Mettenius as synonymous.—*Hooker, Species Filicum*, iii., p. 214.

A. (Euasplenium) ebenoides—Eu-as-ple′-nĭ-um; eb-en-ŏ-i′-des (*ebenum*-like), *R. R. Scott.*

This most singular, greenhouse Fern, of truly North American origin, was first discovered on the limestone cliffs of the Schuylkill River, near Philadelphia; it was eventually gathered near Havana, Central Alabama, and on limestone rocks in Canaan, Connecticut. Eaton, in his excellent work devoted to North American Ferns, says (vol. i., p. 26): "It is singular that, although found in several and widely-distant localities, this Fern has always been met with in the immediate company of the 'Walking Leaf' (*Camptosorus rhizophyllus*) and of *A. ebenum.* While it differs from the first by its dark and shining stalk and rachis and its free veins, as also by its pinnatifid or sub-pinnate frond, it resembles it strongly in the prolonged and slender apex, in the irregular sori, and especially in its proliferous habit; and, in the very respects in which it differs from this, it resembles the other. For these reasons, the Rev. M. J. Berkely, in his notice in the 'Journal of the Royal Horticultural Society,' 1866, p. 87, is strongly inclined to suspect that it is a true natural hybrid of the two. That this view is correct certainly appears probable, but it can only be established by a successful attempt to produce the present plant by artificial hybridising." The fronds, of a soft and papery texture, produced from a short, slowly-creeping rhizome, and borne on very short stalks, are composed, for about one-third of their whole length, of a terminal pinna (leaflet), which ends in a long, slender point about 3in. long and simply notched; their inferior part shows a number of flattened, sessile pinnæ (stalkless leaflets), disposed on each side of the stalk, the upper ones closely placed and connected with it by a broad wing along the midrib, and the lower ones becoming gradually more distinct as they approach the base of the fronds, where the lowest segments are often a little auricled above and below. It is most remarkable that in this singular plant the apex of the frond is often proliferous, as are also a few of the longest segments. The spore masses are disposed in a single row on each side of the midrib of the terminal prolongation, and similarly on the lateral segments or leaflets.—*Eaton*, *Ferns of North America*, i., t. 4. *Hooker*, *Synopsis Filicum*, p. 198.

A. (Euasplenium) ebenum — Eu-as-ple′-nĭ-um; eb′-en-um (ebony-stalked), *Aiton.*

This charming, greenhouse species, although given as from Ecuador and Cape Colony, is a small-growing Fern essentially indigenous in North America. From Eaton we gather that it grows abundantly in Canada and New England, whence it spreads southward to Florida and westward to the Indian Territory and Louisiana; the same authority adds that it is found commonly on sunny or partially-shaded, rocky hillsides, but that it also occurs frequently in moister places. Its pretty fronds, 1ft. to 1½ft. long and 2in. to 3in. broad, are erect, and borne on remarkably short stipites (stalks) of a reddish-brown or nearly black colour and polished; they are simply pinnate (only once divided to the midrib), being furnished with from twenty to forty pairs of leaflets of a papery texture, sessile (stalkless), and placed closely together, so much so that they often overlap each other a little at the enlarged and somewhat auricled bases (Fig. 90). These leaflets are sub-falcate (nearly sickle-shaped), and have, on very small plants, their margins slightly toothed, but in luxuriant specimens these are deeply cut and furnished with toothed lobes. Each leaflet shows a well-marked costa (midvein), close to which the oblong, short sori (spore masses) are disposed at the rate of from ten to twelve on each side, but always in such a way as to leave uncovered the green margin of the pinna. The general appearance of the plant is that of an erect-growing, elongated form of our own *A. Trichomanes.*—*Hooker, Species Filicum*, iii., p. 138. *Nicholson, Dictionary of Gardening*, i., p. 129. *Eaton, Ferns of North America*, i., t. 4.

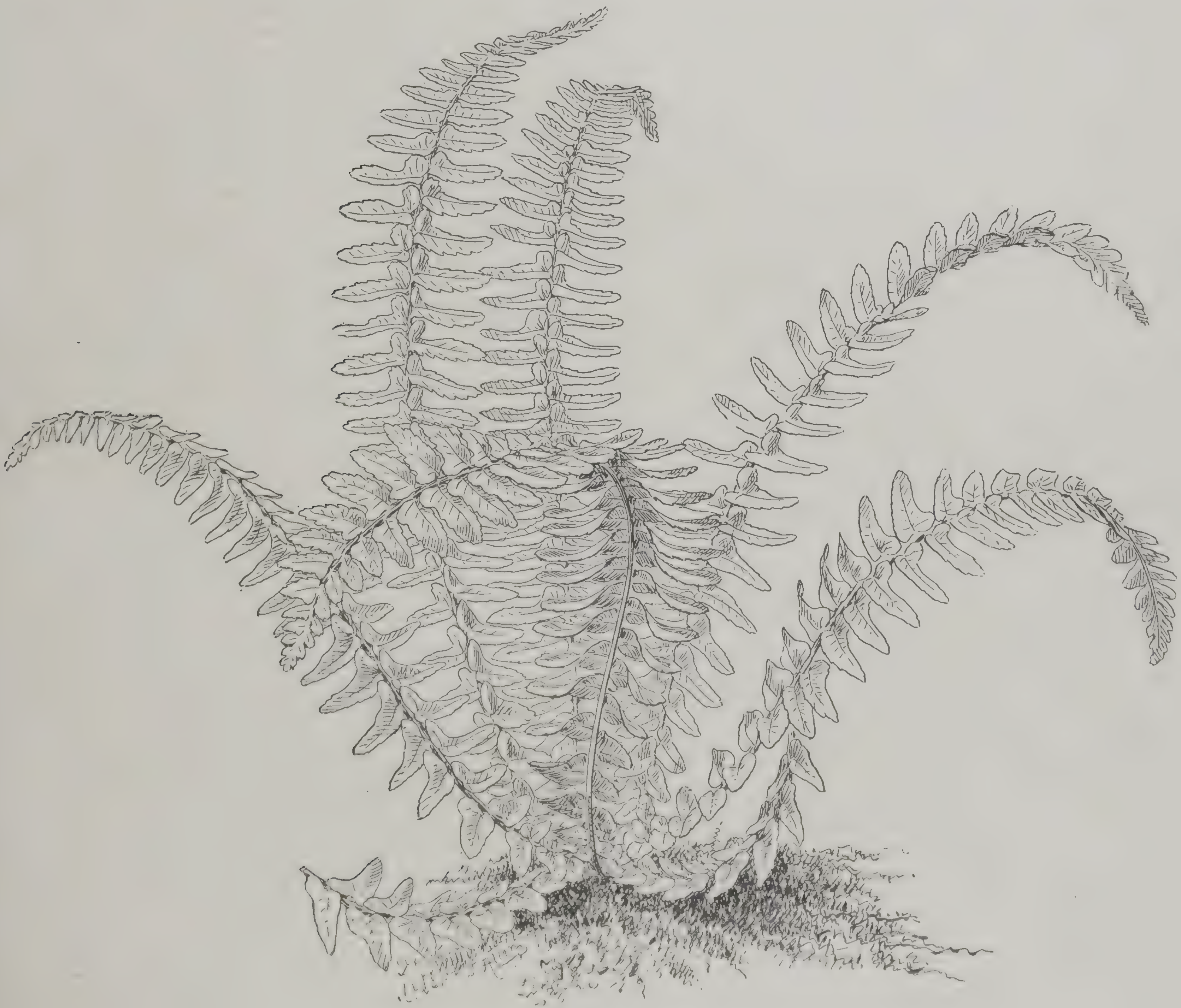


Fig. 90. Asplenium ebenum
(⅓ nat. size).

A. elegantulum—e-leg-an′-tul-um (rather elegant). Synonymous with *A. incisum.*

A. (Euasplenium) ensiforme—Eu-as-ple′-nĭ-um ; en-sif-or′-mĕ (sword-shaped), *Wallich.*

A greenhouse species which, although growing also in Ceylon, is found wild on the Himalayas at 10,000ft. elevation. It is also to be found on the Anamallay Mountains, on the banks of the Toracadoo River, at 4500ft., and in the Sholas of the Kudra Mukh (5500ft.), near Mangalore. Its fronds, which are 1ft. to 1½ft. long and about ¾in. broad, are borne on firm, erect stalks 1in. to 3in. long and scaly below ; they taper gradually towards their lengthened point, have their edge nearly entire, and their lower part very gradually narrowed into the stalk, and are of a coriaceous (leathery) texture. The comparatively broad sori (spore masses) reach nearly to both midrib and margin. See Fig. 91 (reproduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author).—*Hooker, Species Filicum*, iii., p. 90. *Beddome, Ferns of Southern India*, t. 125.

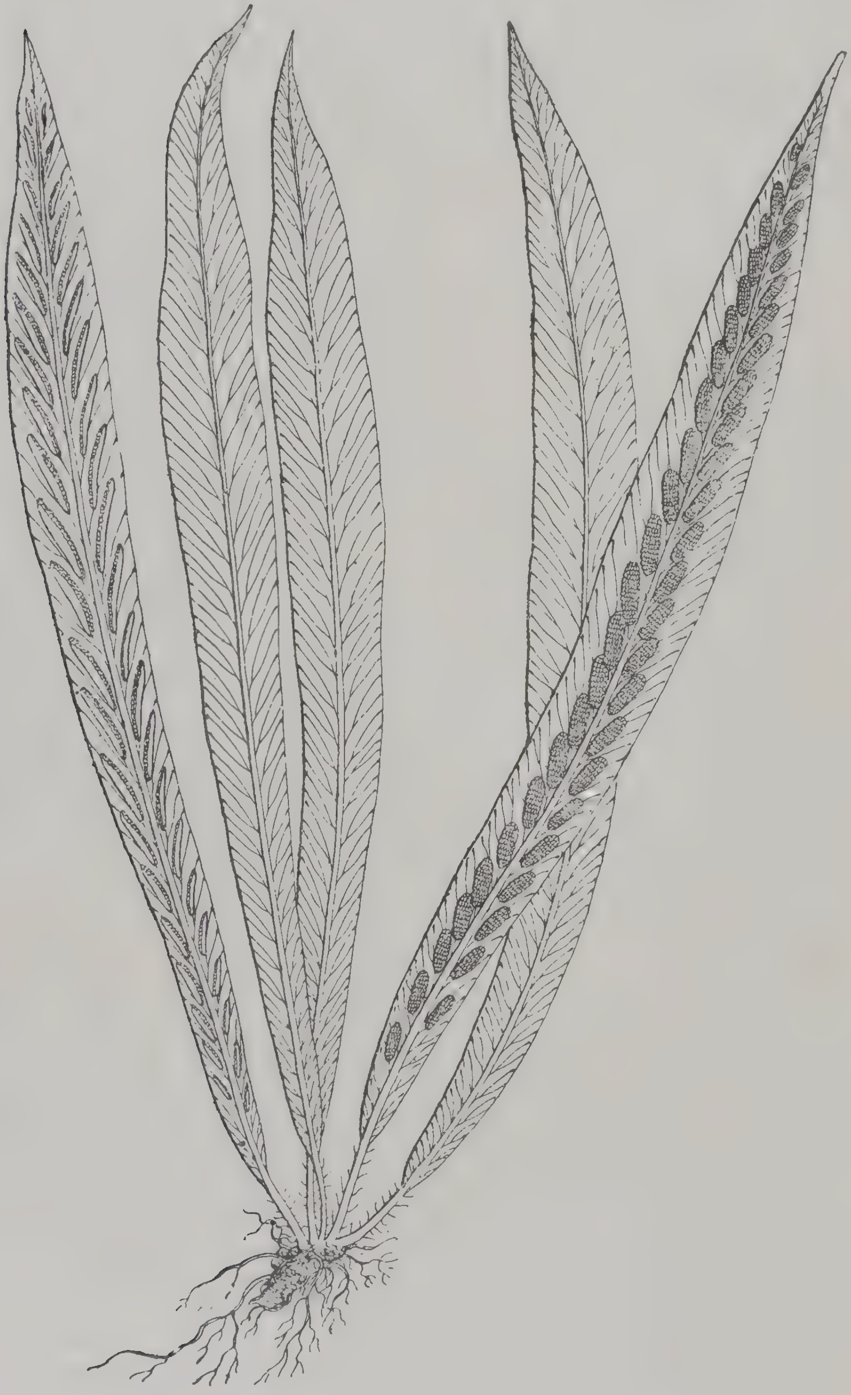
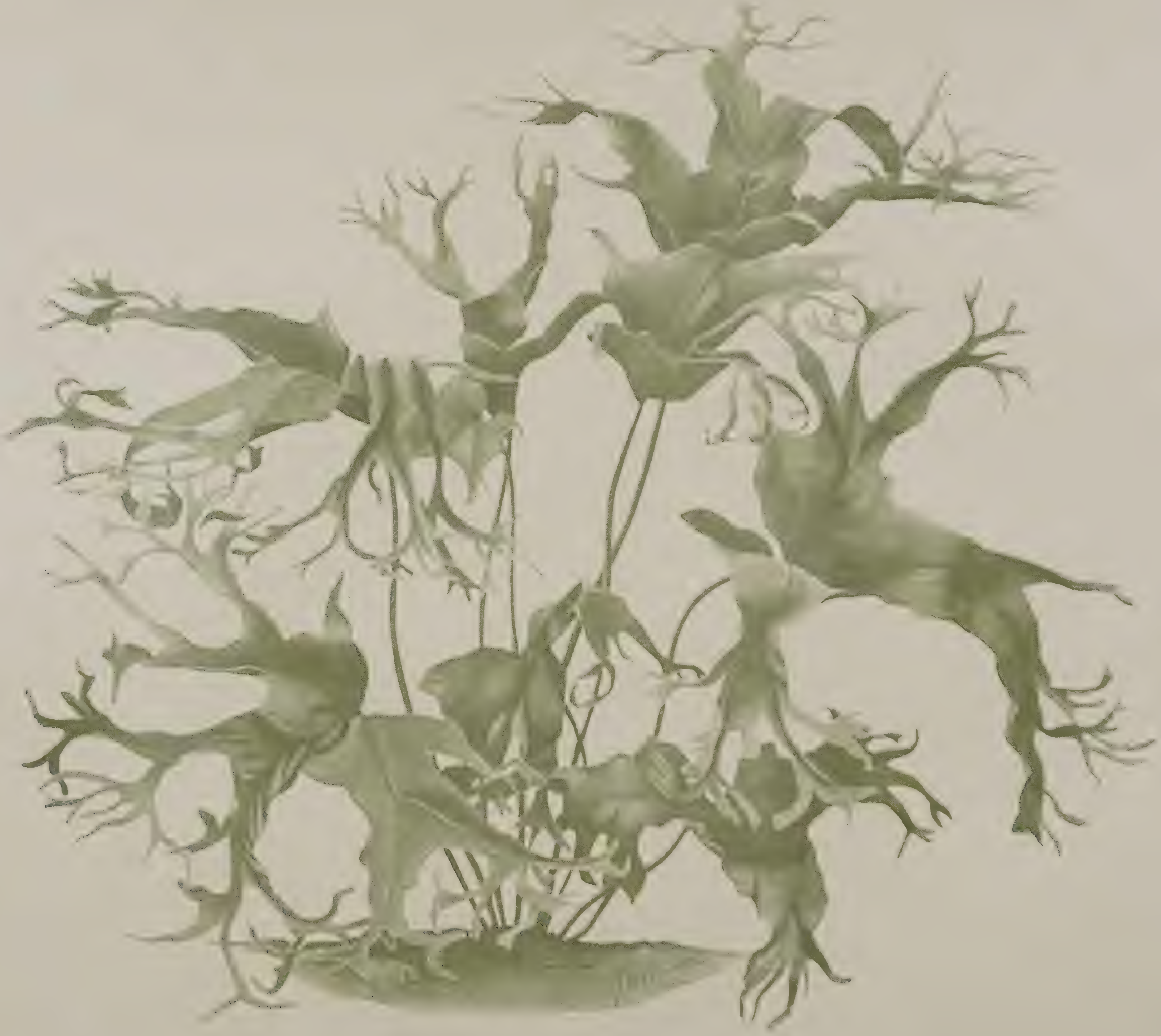


Fig. 91. Asplenium ensiforme
(¼ nat. size)

A. erectum—e-rec′-tum (upright). Synonymous with *A. lunulatum.*

A. (Euasplenium) erosum — Eu-as-ple′-nĭ-um ; e-ro′-sum (bitten), *Linnæus.*

A stove species, native of the West Indies, with fronds 6in. to 12in. long, 4in. to 8in. broad, and borne on firm, erect stalks 6in. to 9in. long



Asplenium Hemionitis multifidum

(½ nat. size).

and nearly naked. The fronds are simply pinnate (divided only once to the midrib) and furnished with from nine to fifteen pairs of leaflets 3in. to 4in. long, ¾in. broad, of a sub-coriaceous (almost leathery) texture, and with their edges slightly lobed and notched. The sori (spore masses) radiate from the midvein and fall short of the edge.—*Hooker*, *Species Filicum*, iii., p. 162. *Nicholson*, *Dictionary of Gardening*, i., p. 129. *Lowe*, *Ferns British and Exotic*, v., p. 25.

A. (Anisogonium) esculentum — An-is-og-o′-nĭ-um ; es-cul-en′-tum (edible), *Presl.*

This robust-growing, stove species, native of Hong-Kong, Formosa, the Malay Islands, &c., is one of the few known Aspleniums with an arborescent caudex (upright stem) forming a sort of miniature Tree Fern. Its gigantic fronds, 4ft. to 6ft. long and fully 3ft. broad at the base, are borne on strong, erect stipites (stalks) 1ft. to 2ft. long ; they are occasionally simply pinnate (only once divided to the midrib), but are usually bipinnate (twice divided to the midrib). The pinnæ (leaflets) are very large, the lower ones measuring from 1ft. to 1½ft. in length and from 6in. to 8in. in breadth. When the frond is bipinnate these leaflets are divided into pinnules (leafits) of a sub-coriaceous (almost leathery) texture, 3in. to 6in. long and 1in. or more broad, with a long, tapering point, their edge being more or less deeply lobed and their base suddenly narrowed and often auricled (eared). The sori (spore masses) are usually disposed on lines situated on all the lateral veinlets, which unite at a short distance from the midvein, there being usually from six to ten veinlets on each lobe.—*Hooker*, *Species Filicum*, iii., p. 268. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

A. (Euasplenium) extensum — Eu-as-ple′-nĭ-um ; ex-ten′-sum (extended), *Fée.*

This rare and very pretty, greenhouse species, allied to our *A. Trichomanes*, is a native of the Andes of Columbia and Peru. Its very elegant fronds are simply pinnate (only once divided to the midrib), 1ft. to 2ft. long and about 1in. broad, and are borne on blackish, polished stipites (stalks) 4in. to 6in. long ; they are composed of from twenty to forty pairs of sessile pinnæ (stalkless leaflets), which differ from those of *A. Trichomanes*, inasmuch as they are very blunt, sometimes nearly round. These pinnæ, of a coriaceous (leathery) texture and dark green colour, have their upper side often cordate (heart-shaped), whilst their lower side is merely rounded, at the base. The sori (spore masses), which are linear-oblong in shape and very abundantly produced, are disposed two or three on each side of the midrib.—*Hooker*, *Species Filicum*, iii., p. 142. *Nicholson*, *Dictionary of Gardening*, i., p. 129.

A. Fabianum—Fab-ĭ-a′-num (Fabia's), *Jacquin*. An essentially distinct form of the popular *A. bulbiferum.*

A. (Euasplenium) Fadyeni—Eu-as-ple′-nĭ-um ; Fad′-yen-i (McFadyen's), *Hooker.*

A stove species, native of Jamaica, and of very little decorative value ; it appears to be simply a feebler plant than the less-cut forms of *A. rhizophyllum*, with fewer and more distant leaflets and leafits.—*Hooker*, *Species Filicum*, iii., p. 192.

A. (Euasplenium) falcatum—Eu-as-ple′-nĭ-um ; fal-ca′-tum (hooked), *Lamarck.*

A very widely-distributed, greenhouse species, of particularly elegant habit, native of the Polynesian Islands, Australia, Ceylon, and, according to Beddome, of the Anamallay Mountains, where it is found growing on rocks at an elevation of 3,500ft. Its fronds, 6in. to 18in. long and 4in. to 6in. broad, are borne on firm, erect, nearly naked stipites (stalks) 6in. to 9in. long and of a greyish colour; they are furnished with from twelve to twenty pairs of pinnæ (leaflets) placed in a nearly horizontal position. These leaflets are from 2in. to 3in. long, about 1in. broad, and terminate in a long, tapering point, their edges being lobed often one-third of the way down and the lobes sharply toothed ; they are of a coriaceous (leathery) texture and dark green colour, and the sori (spore masses) are disposed in long, irregular lines, which extend from the midvein nearly to the edge of the leaflets. *A. falcatum* of Beddome is a synonym of *A. crinicaule.*—*Hooker*, *Species Filicum*, iii., p. 160. *Nicholson*, *Dictionary of Gardening*, i., p. 130. *Beddome*, *Ferns of Southern India*, t. 141.

A. (Euasplenium) fejeense—Eu-as-ple′-nĭ-um ; fe-je-en′-sĕ (Fijian), *Brackenridge.*

This stove species, native of Fiji, Samoa, and Aneitum, is of singular habit, for its entire (undivided) fronds, 1½ft. to 2ft. long and about 1½in. broad, are produced from a wide-climbing rhizome (underground stem) and borne on stalks 6in. long and scaly below. These curious fronds are of a sub-coriaceous (almost leathery) texture, and are caudate or acuminate (ending in a tail-like process) and often proliferous at the extremity. The sori (spore masses) reach from the midrib nearly to the edges of the fronds, which are smooth.—*Hooker*, *Species Filicum*, iii., p. 87. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. Fernandesianum—Fer-nand-e-sĭ-a′-num (from Juan Fernandez). One of the most distinct varieties of *A. lunulatum.*

A. (Darea) ferulaceum — Da′-rĕ-a ; fer-ul-a′-cĕ-um (Fennel-leaved), *Moore.*

This beautiful, stove Fern, native of the Andes of Ecuador and New Granada, is undoubtedly the most finely-divided species belonging to the genus and possesses very little of the general appearance of an Asplenium. Its fronds, which are of a dark yet pleasing colour, are minutely divided (Fig. 92) and resemble much more those of the rare and beautiful *Gymnogramme Pearcei*, or those of the well-known *Pteris scaberula*, than of any other Asplenium. These fronds, which spring from the crown of a short, upright caudex (stem), thus making a miniature Tree Fern, are from 1ft. to 2ft. long and 9in. to 12in. broad; they are borne on erect, naked, pale green stalks 6in. to 12in. long, and are somewhat egg-shaped, most of the pinnæ (leaflets) decreasing gradually upwards, the lowest ones being horizontal, or even deflexed, and from 6in. to 9in. long and 3in. to 5in. broad. The leaflets are divided into pinnules (leafits) which in their turn are subdivided into linear, slightly-flattened segments about 1in. long, of a very delicate and fine texture, and again pinnatifid (cut half-way to the midrib). The ultimate lobes are reduced to mere thread-like organs ¼in. long, and the lateral and abundantly-produced sori (spore masses) are very small.—*Hooker*, *Species Filicum*, iii., p. 216.

A. ferulaceum dislikes loam, and grows more luxuriantly in peat and sand; its stem should be kept constantly moist, which state is best attained by the introduction of a little sphagnum amongst the abundant aërial roots, which are of a fleshy nature, and on which the plant is mainly dependent.

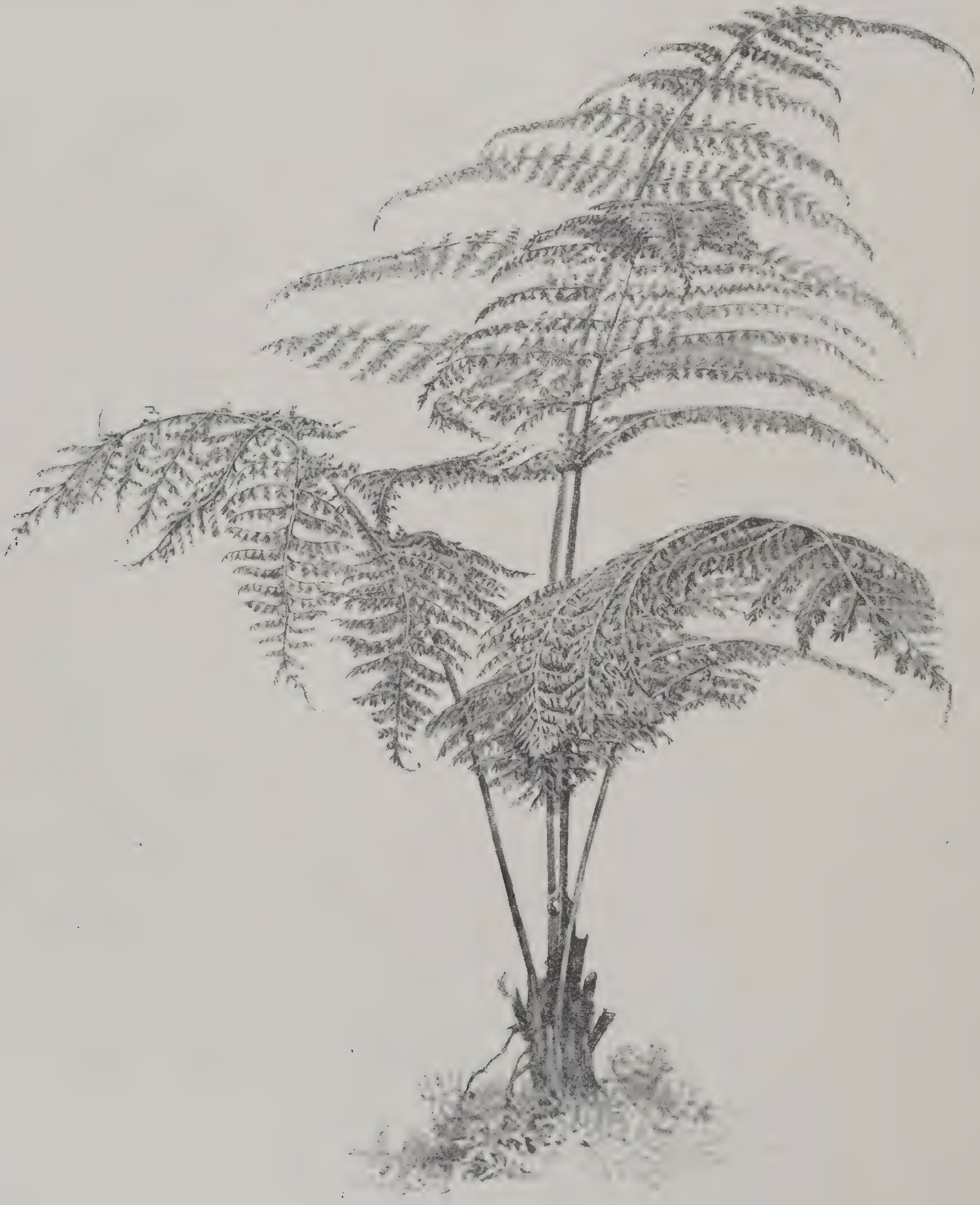


Fig. 92 _ Asplenium ferulaceum
(¼ nat. size).

Indeed, to grow it to perfection this Fern requires a close and naturally moist position in the stove, or a place where the stem may easily be kept damp without, however, interfering with the foliage, which when wetted over soon turns a blackish-brown colour.

A. (Athyrium) Filix-fœmina—Ath-yr′-ĭ-um; Fil′-ix–fœ′-min-a (the Lady Fern), *Bernhardi.*

In point of numbers, *Athyrium* forms the most extensive section, as also the one containing the most varied subjects as regards forms and sizes, in the whole of the genus *Asplenium.* So distinct are they in botanical characters that for many years they have been considered by some of our leading authorities as forming a separate genus, holding a place midway between the true Aspleniums and the Nephrodiums or Lastreas; for the sori (spore masses) are in all cases more or less curved and sometimes even quite horse-shoe-shaped. The plants belonging to the sub-division *Athyrium* are mostly indigenous in Japan, on the Himalayas, and in North America. The only species which is of very cosmopolitan character, though generally termed British, is *Athyrium Filix-fœmina* of Bernhardi and of Roth, or, as it is popularly called, the "Lady Fern."

According to Beddome, *A. Filix-fœmina* grows in many parts of India, and is very abundant in the forests of the north bank of the Godavery-Camptee; on the Himalayas, up to 12,000ft., and also in Japan. It is found wild from the northern part of Europe to Madeira and the Canaries—in Lapland, Russia, and Scandinavia, as well as in France, Italy, Spain, Portugal, &c.—while in Africa it has been reported as a native of Abyssinia, Natal, and the Cameroon Mountains, where it grows up to an elevation of 7000ft.; and it has a wide distribution in America, extending from Sitka and Labrador to Cuba, Caraccas, and Venezuela. Eaton, in his splendid work on the "Ferns of North America" (vol. ii., p. 225), says that *A. Filix-fœmina* is common in most parts of the United States and British America and extends nearly throughout the temperate zone, and that, though growing sometimes in sunny places—as along roadsides and under walls, in which situations it becomes dwarf and more rigid—it is usually found in moist, shady woods and hillsides. This corroborates the innate love of moisture which is peculiar to this Fern and which is so well expressed in the following lines written by Sir Walter Scott, who correctly described the situation it most delights in:

> Hie away, hie away,
> Over bank and over brae,
> Where the copse wood is the greenest,
> Where the fountains glisten sheenest,
> Where the Lady Fern grows strongest,
> Where the morning dew lies longest,
> Where the black-cock sweetest sips it,
> Where the fairy latest trips it;
> Hie to haunts right seldom seen,
> Lovely, lonesome, cool, and green.
> Over bank and over brae
> Hie away, hie away!
>
> —*Waverley*, vol. i., chap. xii.

The typical North American form is identical in habit and size with the European one, and although various attempts have been made to separate them specifically, the opinion of Hooker, Mettenius, and Milde, that they belong to one common species, is undoubtedly correct.

As a British plant, the Lady Fern is first mentioned by Johnson in his edition of Gerard's "Herbal," where, besides giving a description of it and publishing the date of its discovery to the very day, he adds: "It groweth abundantly on the shadowy moist rocks by Mapledurham, near Petersfield, in Hampshire. John Goodyer, July 4th, 1633." The localities where the Lady Fern is to be found in a wild state in the United Kingdom are too numerous to be mentioned here. It is sufficient to say that, although common in the South and in the Midland Counties of England, where it occurs at all elevations up to 3000ft., it is still more abundant in Ireland; indeed, upon the Irish bogs it is so plentiful that it is used for packing purposes, as the common Bracken is in England. It is rarer in the northern parts of Wales and England, and in Scotland.

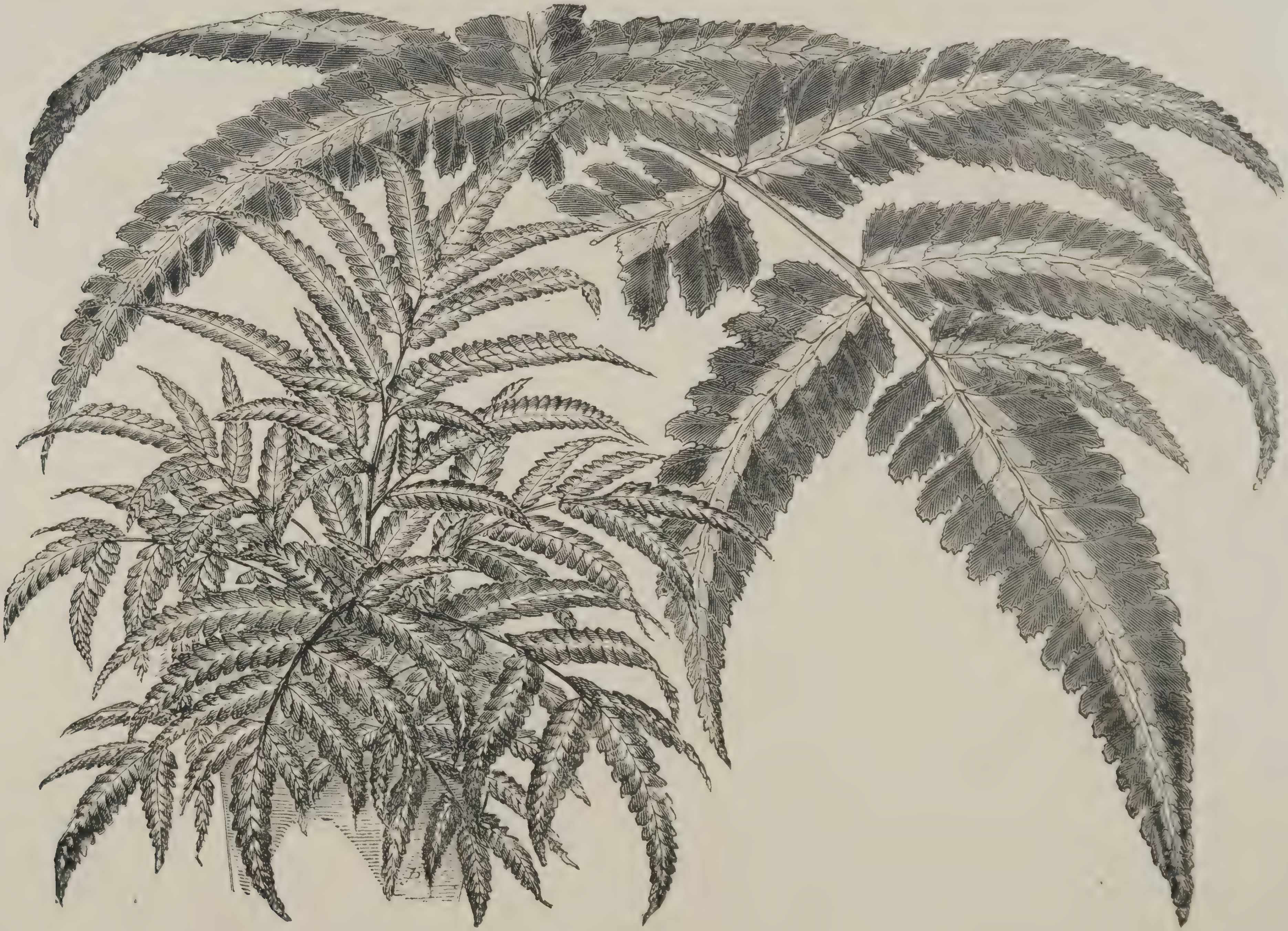
This species, which, whether planted in the outdoor Fernery or grown in pots, is very impatient of water at the roots, is one of the easiest-grown and most decorative of all the British Ferns. Nothing published on the subject up to this day can give better information as regards its requirements and its general use than the statement by Mr. T. Moore contained in his "British Ferns," from which we extract the following: "When placed about rockwork it should occupy a low, boggy situation at the base of the rock, being planted amongst turfy soil, kept thoroughly moistened, either naturally or artificially. It is far less beautiful if planted in dry, exposed situations. Few hardy plants which can be introduced among rockwork are so thoroughly lovely as a vigorous Lady Fern, placed just within the mouth of a cavernous recess large enough to admit of its development and just open enough that the light of day may gleam across the dark background sufficient to reveal the drooping, feathery fronds; and, what is more, it will delight to grow in such a situation if freely supplied with moisture to its roots. In woodland walks, or on the shady margin of ornamental water, no Fern can be more appropriately introduced. When grown in a pot, it requires one of rather a larger size, and should be planted in turfy soil intermixed with fragments of charcoal, sandstone, and potsherds. To attain anything like a fair degree of its ladylike gracefulness, this Fern must under all circumstances be well supplied with water."

The fronds, 1ft. to 3ft. long and 6in. to 12in. broad, are borne on firm, erect, straw-coloured or brownish stipes (stalks) scaly below and 6in. to 12in. long; they are remarkably light in form, plume-like and graceful, and are disposed in a crown situated at the summit of a rootstock which in old plants is often very large and stem-like, but which, even then, remains lying upon the surface of the ground. The leafy portion of the fronds is oblong-spear-shaped, with numerous pinnæ (leaflets), the lower ones of which are spreading, spear-shaped, 3in. to 6in. long and 1in. to 1½in. broad, cut down to a compressed, winged rachis (stalk) into leafits which in their turn are again deeply incised. The texture is soft and papery. The sori (spore masses) are usually linear-oblong, though the lower ones are often curved.—*Hooker*, *Species Filicum*, iii., p. 217. *Nicholson*, *Dictionary of Gardening*, i., p. 130. *Lowe*, *Our Native Ferns*, ii., p. 4.

No Fern native of the British Islands is so variable in its forms and in its dimensions as this one, for its varieties, though they all pass into one another by various gradations, are innumerable; so much so that we have it on the authority of B. S. Williams that "when gathering examples of this Fern on the Yorkshire hills, where it is prevalent, it is almost an impossibility to find the normal state," but that "any quantities of fantastic shapes can be found." Several hundred more or less striking varieties, very graceful and distinct from one another, are, or have been, known in English collections (Mr. P. Neill Fraser, of Edinburgh, in his list published March, 1865, enumerates 243 forms of the Lady Fern). The scope of the present work not allowing for the full description of all of them, we have limited ourselves to the most distinct and constant of these forms, which rightly or wrongly are by some people termed simple monstrosities. These, which for some unknown reason are naturally produced much more abundantly in the British Islands than in any other country, should for safety be propagated exclusively by the division of the crowns, an operation which is best performed in February or March, before vegetation commences.

A. F.-f. acrocladon—ac-roc′-lad-on (summit-branched), *Moore.*

This is one of the most beautiful, if not indeed *the* most remarkably-crested, of all known forms of the Lady Fern. It was originally found in a wild state growing by a roadside on the moor-track between Byland and Rivaulx Abbeys, in Yorkshire. One plant of it only was discovered there, and no other has since been found wild anywhere else. The most singular thing in connection with this find is that it happened in a locality where some other Lady Ferns were growing, all of which, however, were quite normal; and although various botanists have searched the station many times, no second plant of *acrocladon* has been discovered, nor has even a slight divergence from the normal form of *Athyrium* been found in that locality. Although it is usually known as a variety of small dimensions, seldom exceeding 1¼ft. in height, Mr. A. Clapham, to whom it was presented by the discoverer, could boast in 1863 of having a specimen (the original plant) fully 2ft. high and as much in diameter, a mass of exquisite foliage somewhat resembling that of the more widely-distributed *A. F.-f. crispum*, but more vigorous and much more erect in growth. The fronds, of no really definite form, are borne on stalks stout at the base, where they divide near the crown, the divisions becoming repeatedly forked without any regularity whatever (Fig. 93) and forming a densely-ramified mass of foliage of a peculiarly light green colour. The lower part of the frond is very narrow, and the extremities of the divisions and those of the irregular pinnæ (leaflets) are all densely tasselled or crested; in the upper portion of the frond, which is freely branched, the pinnæ and pinnules (leafits) are unsymmetrically



Aspidium aristatum variegatum, showing Habit and Portion of detached Frond
(Habit, $\frac{1}{10}$ nat. size ; Portion of Frond, $\frac{1}{2}$ nat. size).

notched and toothed, and form a broad head almost round in shape. If not entirely barren, it is but very seldom that this variety has been known to produce spores, and its propagation invariably takes place by means of the division of its crowns.—*Lowe, Our Native Ferns*, ii., p. 74, t. 38. *Nicholson, Dictionary of Gardening*, i., p. 130.

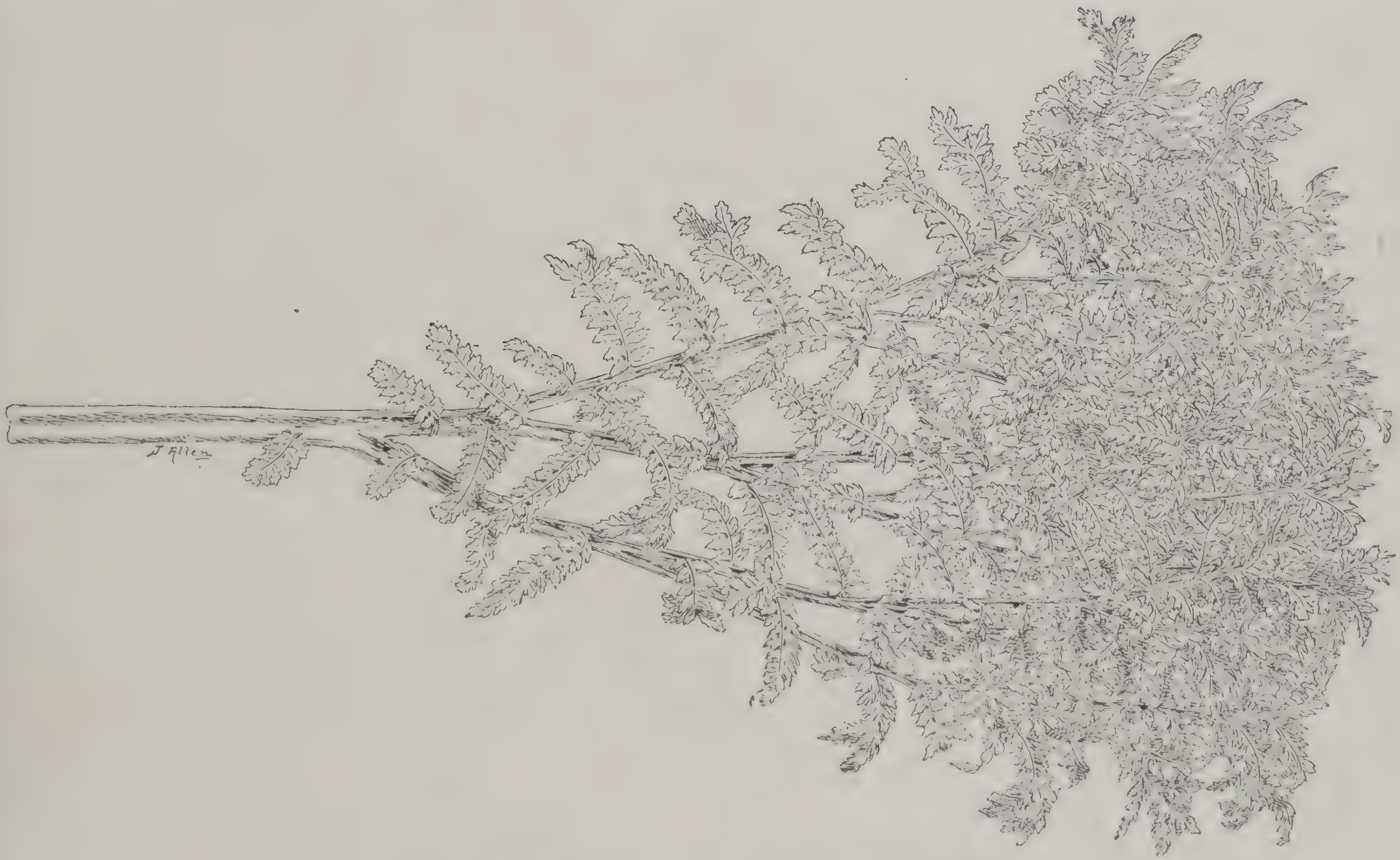


Fig. 93. Frond of Asplenium Filix-fœmina acrocladon
(⅓ nat. size).

A. F.-f. acuminatum—ac-u′-min-a′-tum (taper-pointed), *Moore.*

A very singular and interesting variety, of dwarf habit, originally found on Snowdon. Its fronds, broadly spear-shaped and about 1ft. in length, have their pinnæ (leaflets) crowded, short, deflexed below, the longest of them terminating in a serrated, tapering point. The dentation of the pinnules (leafits) and lobes is also sharp and long. The abundant sori (spore masses) are situated in lines near the costa (midvein).—*Lowe, Our Native Ferns*, ii., p. 12, fig. 286. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. apiculatum—ap-ic-ul-a′-tum (apiculate), *Lyall.*

A lovely, delicate, slender form, native of Fifeshire, with fronds 9in. to 15in. long and about 3in. broad, furnished with narrow and caudate (tailed) leaflets, which are closely set with small, roundish, obtuse, serrated pinnules (toothed leafits). The point of the frond is very slender and two or three times finely forked.—*Lowe, Our Native Ferns*, ii., p. 128, fig. 467. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. Applebyanum—Applĕ-by-a′-num (Appleby's), *Moore.*

This is one of the most distinct and one of the prettiest of the known varieties artificially raised. Its fronds, 1ft. to 2ft. long, are very narrow and for about 10in. nearest to the base are furnished with short, blunt pinnæ (leaflets) less than 1in. in diameter. At about 5in. from its summit the frond becomes branched and branched again, until it becomes dilated into a broad, forked crest, formed of numerous leaflets twice or thrice divided. This crest is very striking upon such a narrow frond, on the basal half of which the pinnæ resemble those of *A. F.-f. Frisellicæ;* in the upper half of the frond they more nearly resemble those of *A. F.-f. Fieldiæ*, being abruptly branched and lying along the rachis (stalk of the leafy portion), which, through their peculiar mode of wrapping over, they entirely hide. Though fertile, this beautiful form seldom reproduces itself from spores.—*Lowe, Our Native Ferns*, ii., p. 27, fig. 308. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. Barnesii—Barnes′-ĭ-i (Barnes's), *Lowe.*

The fronds of this singular variety, found in Levens Park, are about 8in. long and only about 1in. broad. The pinnæ (leaflets), as organs usually understood, are wanting, and their place is taken by wide, remarkably ragged or laciniated pinnules (leafits) and a terminal one much larger but equally irregular. These pinnules, which vary in size and form, are sharply dented and of a very membranous texture.—*Lowe, Our Native Ferns*, ii., p. 29, fig. 310. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. calothrix—cal-oth′-rix (beautiful hair), *Moore.*

This remarkably fine and elegant variety, by far the most finely-divided of all those in cultivation, was raised amongst a batch of *A. F.-f. plumosum.* Its fronds, of a pale green colour and somewhat spear-shaped, seldom attain more than 1¼ft. in length and 6in. in breadth at their widest part; they are copiously divided into exquisitely fine segments, so that they present a very light and delicate appearance. For several years it was thought that this variety was barren, but latterly several batches of young seedlings partaking of the distinctive characters peculiar to the parent have been raised by various cultivators.—*Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. capitatum—cap-it-a′-tum (having a head), *Moore.*

This variety, originally found in a wild state at Ilfracombe, Devonshire, is distinguished from most others by its large size as well as by the peculiar form of its pinnæ (leaflets). Its fronds, 1½ft. to 2ft. long and fully 6in. broad, are furnished with pinnæ rather distantly set, broadest at the base, tapering somewhat irregularly and much narrowed at their extremity. Three or four full-sized pinnules (leafits) situated at the extremity of the pinnæ form a terminal tuft. The upper half of the frond is more irregular and more deeply laciniated. A distinctive character of this variety is the claret-red colour of the stalks, which are very stiff.—*Lowe*, *Our Native Ferns*, ii., p. 120.

A. F.-f. Clarissimum — Cla-ris′-sim-um (named in compliment to Clara, his wife, by *Col. Jones*).

This remarkable Fern, which ranks as one of the most distinct and beautiful forms of *A. Filix-fœmina*, and which was found wild in North Devon, has been the means of illustrating a newly-discovered mode of reproduction called "Apospory," by which means any Ferns partaking of this character are propagated without the help of the spore. This singular phenomenon, which affects several varieties of the Lady Fern, was first observed by Mr. G. B. Wollaston, then by Mr. C. T. Druery, Mr. Mapplebeck, and Col. Jones; it is fully described and illustrated at page 141 of the present work.

The fronds of *A. F.-f. Clarissimum*, fully 2ft. long, 1ft. broad, and of an elegant arching habit, are of a very light green colour and as finely divided (Fig. 94) as those of *A. F.-f. plumosum.* Until now this variety has failed to produce spores, though peculiar growths taking the place of the sori are produced in abundance: these, however, have never been found to contain any well-developed ordinary spores. Consequently, this variety is increased exclusively by means of its pinnæ (leaflets) being, in autumn, when the fronds are fully developed, imbedded edgewise half-way in light, prepared soil, the singular bud-growths being thus brought into immediate contact with it. The pan or pot containing them being placed in gentle heat, these pseudo-bulbils soon begin to increase in size, and, under favourable conditions, the first fronds are produced through the process above described in the course of six months or less; afterwards the young plants require to be subjected to a treatment similar to that usually given to Fern seedlings.

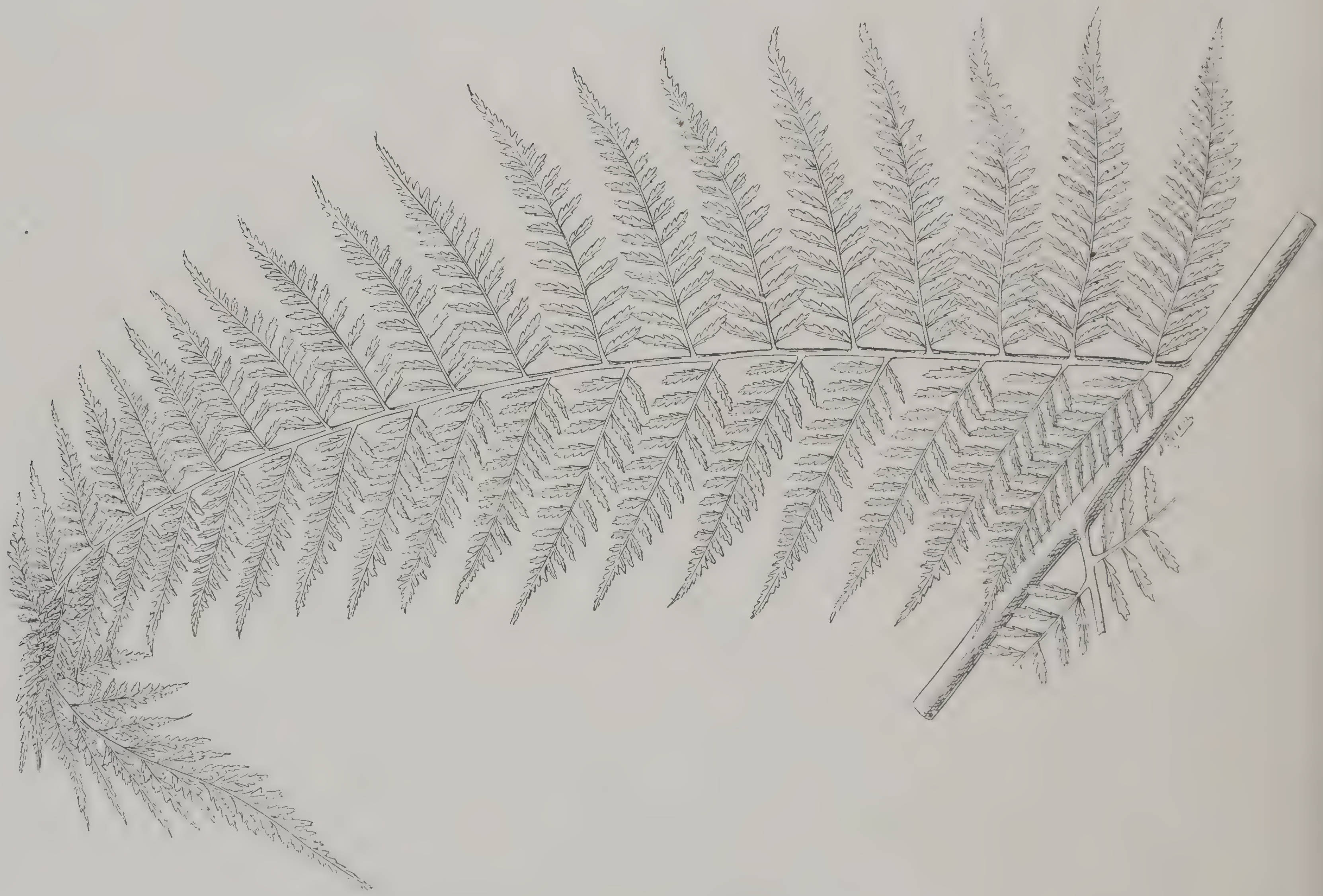


Fig. 94. Pinna of Asplenium Filix-fœmina Clarissimum
(nat. size).

A. F.-f. conioides—co-ni′-ŏ-i′-des (resembling Conium or Hemlock), *Appleby.*

One of the handsomest of all the cultivated forms with plain fronds. These, quite 2ft. in length and borne on pale-coloured stalks furnished with light brown scales, are broadly spear-shaped. The name of this variety is derived from a resemblance to Hemlock-leaves in the outline and divisions of the fronds, which are very spreading, 6in. to 9in. broad and furnished with pinnæ (leaflets) irregular in outline, somewhat distant, and acuminate (ending in a long taper-point). The pinnules (leafits) are mostly ovate (egg-shaped), sometimes oblong, very broad, crowded and overlapping, crispy, and here and there short-forked into distant lobes notched almost to the point, these again being notched with short, minute teeth. In the fertile fronds the pinnules taper to an acute point and the lobes are narrower and more distant. The sori (spore masses) in this beautiful variety are situated near the base of the lobes.—*Lowe*, *Our Native Ferns*, ii., p. 7, fig. 279.

A. F.-f. contortum—con-tor′-tum (twisted), *Stansfield.*

This variety is really more curious than beautiful; it was raised from spores at Todmorden and has proved quite constant. The fronds, of a slender habit, 12in. to 14in. long and about 3in. broad, are provided with pinnæ (leaflets) and especially with pinnules (leafits) that are much contorted (twisted back) and very variable in form and size.—*Lowe*, *Our Native Ferns*, ii., p. 33, fig. 316. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. coronatum—cor-o-na′-tum (crowned), *Moore.*

A very beautiful variety, of dwarf dimensions, well named on account of its crowded apex. Its fronds, 6in. to 12in. long, 2in. broad, except the terminal crown, which is at least 3½in. to 4in. across, are provided with distinctly-forked pinnæ sometimes slightly crested at their extremity. The rachis (stalk of the leafy portion) is dilated from the centre of the frond and throws out a number of branches, which cross each other and thus produce a large, compact, much-divided tassel. Instead of being pale green, as is mostly the case, the rachis is of a light red colour, which greatly adds to the decorative value of the plant.—*Lowe*, *Our Native Ferns*, ii., p. 35, fig. 319. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. corymbiferum—cor-ymb-if′-er-um (corymb-bearing), *Moore.*

This is a very handsome, robust-growing, tasselled variety, originally found wild in Guernsey, but latterly abundantly raised from spores, by which means it reproduces itself pretty freely. Its handsome fronds, 1ft. to 1½ft. long by 5in. to 8in. broad, are broadly spear-shaped. The pinnæ (leaflets) are closely set, usually forked and crested at their extremity. The corymbose (clustered) termination of the frond consists of dilated, spreading ramifications bearing pinnules (leafits) throughout and forming a crest, or rather a corymb, nearly or quite as wide as the broadest portion of the frond. This variety differs from all other crested forms of the Lady Fern in the great breadth of its pinnules as also in the larger size of its tasselled extremities and the red colour of its stalks. From home-raised seedlings several striking sub-varieties have been produced, the principal ones being *corymbifero-depauperatum* of Wollaston and *Lowei* and *strictum* of Lowe.—*Lowe*, *Our Native Ferns*, ii., p. 37, t. 37. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. Craigii—Craig′-ĭ-i (Craig's), *Moore.*

A very elegant variety, of small dimensions, raised from spores at Levens Hall, Milnthorpe. Its fronds, seldom more than 8in. long and about 1in. broad, are borne on red stalks; their pinnæ (leaflets), variable in shape and very leafy, are crested throughout, except the two at the base of the frond, which are smaller, descending, and not crested. The extremity of the fronds is branched and forms a crest fully 2in. across. This variety reproduces itself very freely from spores.—*Lowe*, *Our Native Ferns*, ii., p. 112, fig. 445.

A. F.-f. crispum—cris′-pum (crispy or curled), *Moore.*

This slender variety, of comparatively dwarf habit, originally found on Orah, a hill in County Antrim, Ireland, and subsequently at Todmorden, Lancashire, and in Corymulzie Lynn, Braemar, Scotland, more closely resembles a tuft of fine curled parsley than a Fern. Its fronds, which branch in every possible manner, each ramification terminating in close, obtuse tassels, are seldom more than 8in. high, densely set with very finely-divided pinnæ (leaflets), and present a peculiar, crispy appearance.—*Lowe*, *Our Native Ferns*, ii., p. 34, figs. 317 and 318. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. cristatum—cris-ta′-tum (crested), *Monkman.*

Many are the forms of the Lady Fern which can only be described as "crested," bearing more or less dense tassels at the extremity of their fronds and pinnæ. Among the most striking are those which in commerce are known as *cristulatum* of Wollaston, a beautiful dwarf form raised from spores, having the extremity of its fronds multifid (much-cleft) and many of the pinnules (leafits) minutely crested; and *cristato-polydactylum* of Stansfield, another home-raised form which may be described as a splendid improvement on *A. F.-f. multifidum*, with short fronds ending, as well as its pinnæ, in massive crown-like crests, rendering the plant very distinct.—*Lowe, Our Native Ferns*, ii., p. 14, figs. 454 and 290.

A. F.-f. dareoides—da′-rĕ-ŏ-i′-dēs (Darea-like), *Moore.*

A very singular and quite distinct variety, originally found near Castle Kelly, County Dublin. Its fronds, 1½ft. long and about 8in. broad, are furnished with pinnæ (leaflets) that overlap each other and taper to a point; their pinnules (leafits) are distinct and deeply pinnatifid (cut nearly to the midrib), thus forming narrow lobes toothed only at the end, the indentations being entire at their edges. The sori (spore masses) are most singularly disposed in the angles of the segments, thus projecting beyond the margin of the frond, and forming a single row on either side of and near to the costa (midvein); the pinnules also bulge forward.—*Lowe, Our Native Ferns*, ii., p. 38, fig. 322.

A. F.-f. depauperatum—de-pau-per-a′-tum (impoverished, starved), *Wollaston.*

This remarkable variety, with tasselled fronds of unsymmetrical development, 8in. to 12in. long and 2in. broad, was originally found near Ben Bulgen, in Sligo, Ireland. The fronds terminate in a many-branched, flattish, somewhat fishtail-shaped head 3in. or 4in. wide, while the point of each of the pinnæ (leaflets), which are depauperated and irregularly laciniated, ends in from three to six feathery little crests.—*Lowe, Our Native Ferns*, ii., p. 42, fig. 328.

A. F.-f. dissectum—dis-sec′-tum (dissected), *Wollaston.*

A variety with very lax foliage, of elegant habit, originally found in Ireland. Its fronds, although only 1ft. in length, are usually 9in. in breadth and irregular in appearance; their pinnæ (leaflets) are crowded, not quite equal in length, and suddenly acuminate at the apex; their pinnules (leafits), irregular in shape and size, mostly blunt egg-shaped and cut into unequally-toothed lobes, are separated by wide, open sinuses (depressions). The stalk and rachis are sparingly furnished with light brown scales, so conspicuous as to have the appearance of prickly processes (Fig. 95).—*Lowe, Our Native Ferns*, ii., p. 44, figs. 331 and 332. *Nicholson, Dictionary of Gardening*, i., p. 130.

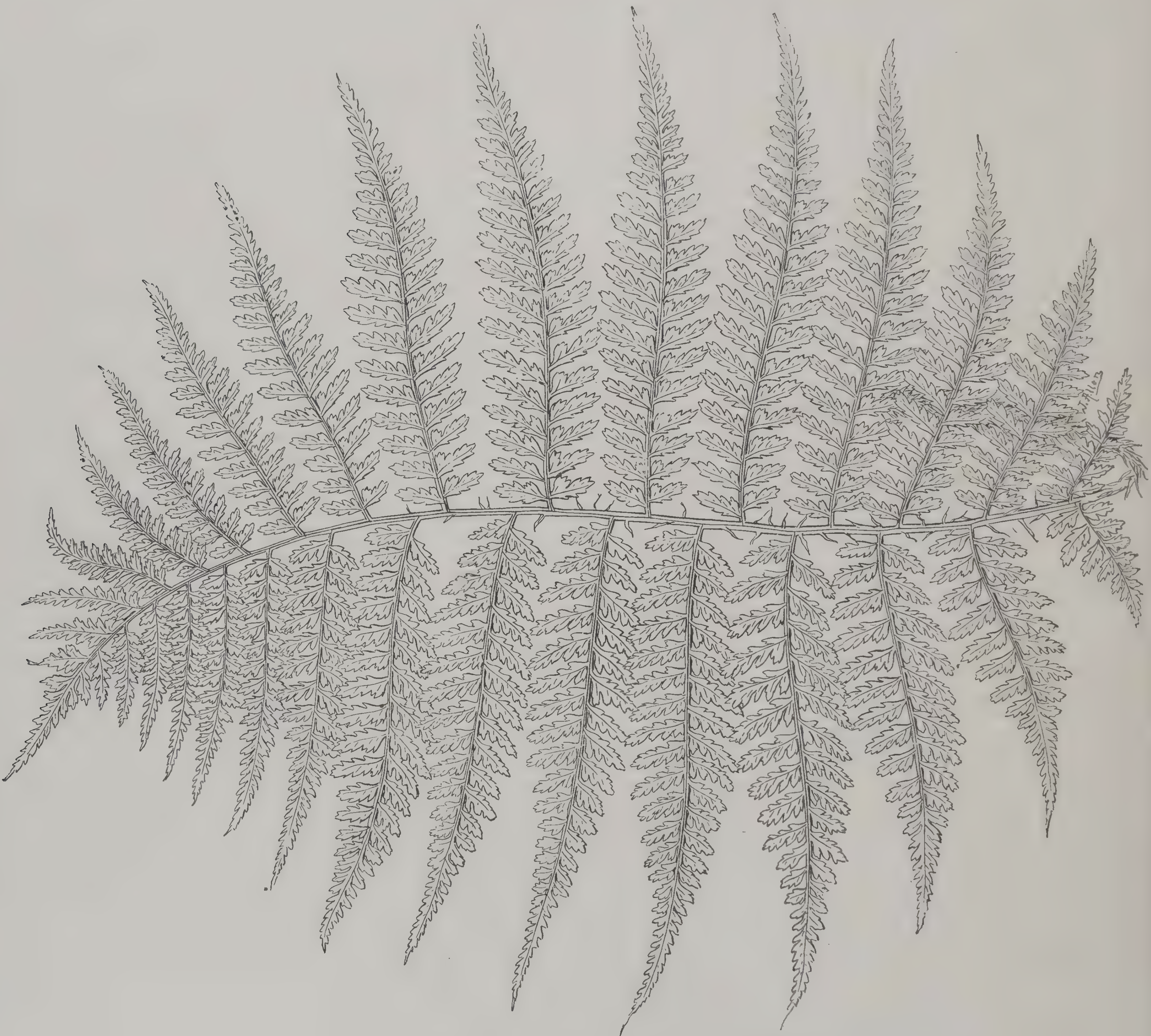


Fig. 95. Frond of Asplenium Filix-fœmina dissectum
(½ nat. size).

A. F.-f. doodioides—doo-dĭ-ŏ-i′-dēs (Doodia-like), *Lowe*.

This exceedingly distinct and beautiful variety, originally found wild in Sussex, appears to be quite constant. Its fronds, about 1½ft. long and 6in.

broad, are furnished with pinnæ (leaflets) which in form resemble the frond of a Doodia; the short and irregular pinnules (leafits) make the pinnæ very narrow, whilst their segments are conspicuously toothed at the extremity. —*Lowe, Our Native Ferns*, ii., p. 115, fig. 449.

A. F.-f. Edwardsii—Ed-ward′-sĭ-i (Edwards's), *Lowe.*

This remarkably dwarf variety is as distinct and pretty as it is singular. Its fronds, seldom more than 8in. long and 2½in. broad, have a peculiarly overlapping and crisped appearance owing to the disposition of their pinnæ (leaflets), which are crowded, imbricated, and taper towards both the base and the extremity. The sori (spore masses) in this form are placed in a single row near the costa (midvein). It reproduces itself very freely from spores.—*Lowe, Our Native Ferns*, ii., p. 103, fig. 432.

A. F.-f. Elworthii—El-wor′-thĭ-i (Elworthy's), *Moore.*

A magnificent form, originally found wild near Nettlecombe. Its fronds, fully 2ft. long, 7in. broad, and of stout substance, are more profusely crested than those of any other known large-growing variety; they are tripinnate (three times divided to the midrib) and bear at their summit a densely crispy, flattish crest 4in. to 6in. across. The pinnæ (leaflets) arch gracefully, as if bent by the weight of the heavy, fan-shaped tassels produced at their extremity. All the lesser divisions, even to the third degree, are more or less flat or dilated at their point and fimbriated (fringed) with many minute teeth on the extreme end. The lobes, which are deeply cut, form a row of coarse teeth along the edges of the pinnules (leafits).—*Lowe, Our Native Ferns*, ii., p. 46, figs. 335 and 336. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. Fieldiæ—Field′-ĭ-æ (Miss Field's), *Moore.*

This remarkable and distinct form, originally found wild in the neighbourhood of Tunbridge Wells, is unlike any other form of the Lady Fern. Its singular fronds, 2ft. or more in length and only 1in. broad, except immediately below the apex, where they are about 1½in. broad, are short-stalked, only about 6in. of their basal part being destitute of pinnæ (leaflets). The leaflets are short and narrow, approximate (set close together but not united) and divided at the base into two short, equal-sized pinnules, one part ascending and the other descending, thus giving the frond a singular cruciform appearance. Near the top the pinnæ merge into alternate (not opposite) pairs of gradually diminishing, crowded, deeply-cut, and toothed divisions. The fronds terminate in a narrow, normal, unbranched, truncate extremity. See Fig. 96. —*Lowe*, *Our Native Ferns*, ii., p. 50, fig. 342. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

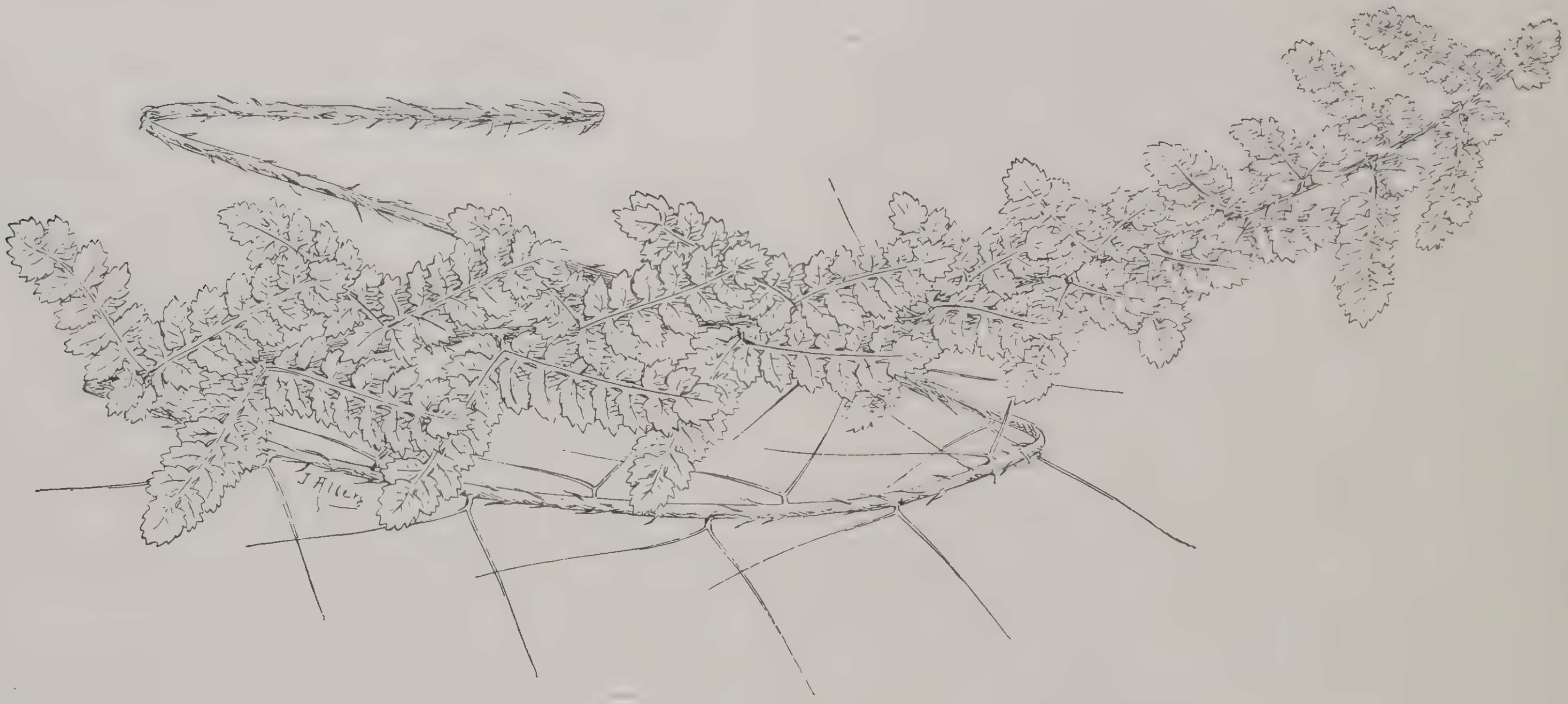


Fig. 96. Upper Portion of Frond of Asplenium Filix-fœmina Fieldiæ, with Lower Portion showing arrangement of Pinnæ

($\frac{2}{3}$ nat. size).

This extraordinary form has, under cultivation, produced numerous subvarieties, the most distinct of which are the following:

A. F.-f. F. compositum—com-pos′-it-um (compound or aggregate), *Ivery*.

This is a strong-growing form, whose fronds frequently attain 3ft. in length and 7in. in width at the base, contracting from 2in. from the middle of the frond. Their pinnæ (leaflets) are more or less horizontal on the lower half of the frond. In the upper half they branch at the base in the way of *A. F.-f. Fieldiæ*, but are more horizontal, crowded, and irregular in length. The sori (spore masses) are large and abundant.—*Lowe*, *Our Native Ferns*, ii., p. 120, fig. 455.

A. F.-f. F. c. multifidum—mul-tif′-id-um (much-cleft), *Ivery*.

A singular and pretty form, which differs from the preceding one mainly in having the basal pinnæ furcate and in having the apex of the frond branched and the tips of each branch forked, forming a tassel about 3in. wide.—*Lowe, Our Native Ferns*, ii., p. 121, fig. 456.

A. F.-f. F. imbricatum—im-bric-a′-tum (imbricated), *Ivery.*

An exceedingly interesting form, differing from *A. F.-f. Fieldiæ* in having the pinnæ (leaflets) of its fronds conspicuously imbricated (overlapping). It was raised from spores by Mr. Ivery, of Dorking, and is tolerably constant. —*Lowe, Our Native Ferns*, ii., p. 143, fig. 492.

A. F.-f. F. pumilum—pu′-mil-um (small), *Moore.*

This very pretty sub-variety, of small dimensions, is particularly striking, for its elegant fronds, seldom above 1ft. in length and ½in. broad from their base to their point, have their extremity rounded. The leaflets are crowded, and some of their pinnules (leafits) occupy an ascending, while others occupy a descending, position, much in the same way as those of *A. F.-f. Fieldiæ*, of which the present plant appears to be quite a miniature form.—*Lowe, Our Native Ferns*, ii., p. 51, fig. 343.

A. F.-f. flexuosum—flex-ŭ-o′-sum (having pinnæ disposed in a zigzag manner), *Moore.*

A singular and pretty form, of medium growth, found wild at Windermere. It differs from all other known forms by the flexuose character of its rachis (stalk of the leafy portion) and in the grotesque way in which the pinnæ (leaflets) are twisted. The fronds, 1½ft. long, are quite 6in. wide throughout.—*Lowe, Our Native Ferns*, ii., p. 49, fig. 341.

A. F.-f. Fraserii—Fra′-ser-ĭ-i (Fraser's), *Lowe.*

This variety, probably the handsomest of all the broad-fronded ones known, was originally found wild in Larrington Glen, Lanarkshire. Its fronds, 3ft. or more long and 10in. broad, are of a deep green colour. They are furnished with pinnæ (leaflets) 5in. long and about 1½in. wide. The pinnules (leafits), about ¾in. long and ¼in. broad, are blunt-pointed, entire, and fringed on the sides with short teeth, which give the whole frond the appearance of being imbricated, for each pinna fairly overlaps the preceding one.—*Lowe, Our Native Ferns*, ii., p. 52, fig. 345.

A. F.-f. Friselliæ—Fris-el′-lĭ-æ (Frizell's), *Bain.*

This very distinct and elegant form, which, like the preceding variety, has few rivals among the numerous forms of the Lady Fern, was originally a wild find, although we cannot discover any record of its habitat. Its fronds, of an arching or pendulous character, attain 2ft. in length and are of equal width throughout, rarely exceeding 1in. Their curious pinnæ (leaflets), which are attached closely to the stalk, are so many short, rounded or solid, leafy, semi-circular, flabellate (fan-shaped) organs, disposed in two overlapping parts deeply fimbriated or toothed all round their edges; these pinnæ in the lower part of the frond are opposite, but from the middle upwards they are alternate, and the frond ends in a larger terminal pinna (1, Fig. 97).—*Lowe, Our Native Ferns*, ii., p. 53, fig. 346. *Nicholson, Dictionary of Gardening*, i., p. 130.

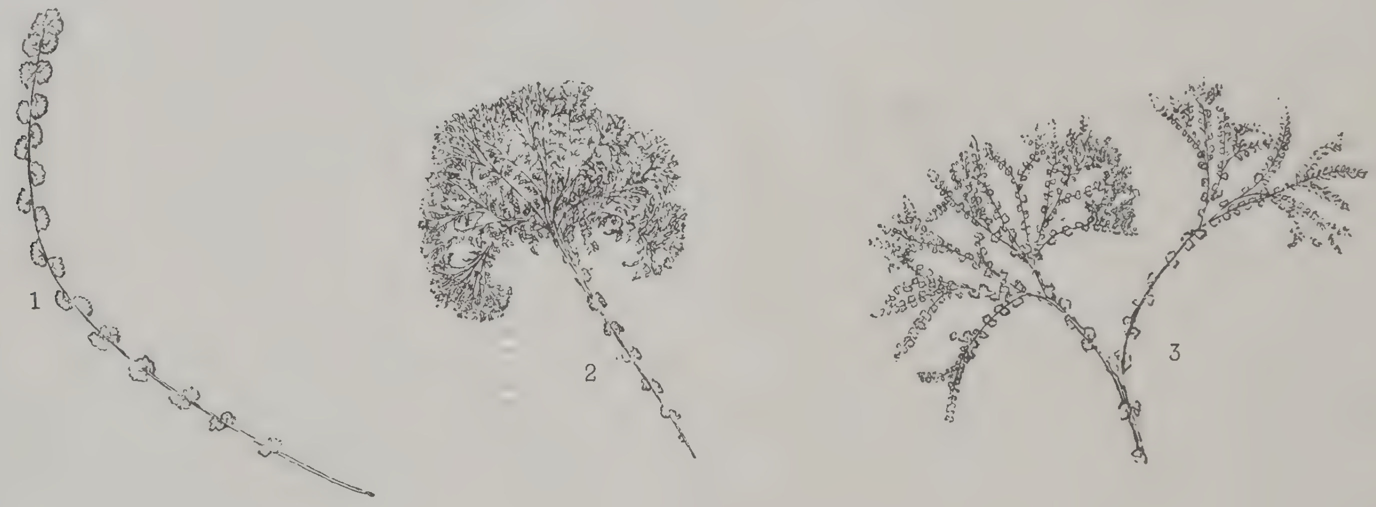


Fig. 97. Forms of Asplenium Filix-fœmina Friselliæ

1, Frond of Normal Form (much reduced); 2, Top Half of Frond of var. *cristatum* (⅓ nat. size); 3, Crest of var. *ramosum* (⅓ nat. size).

Among the prettiest and most distinct sub-varieties known in commerce may be mentioned *nanum* (*Lowe*, ii., fig. 347), a dwarf form having fronds only 8in. long, with pinnæ nearly opposite throughout and rather larger than those of *A. F.-f. Friselliæ.* The sub-variety *cristatum* (2, Fig. 97; *Lowe*, ii., fig. 490), also a dwarf form, raised from spores, has fronds only about 8in. long and about ½in. broad on the whole of their length, except at the extremity, where they become branched and crested and measure about 3in. in breadth; their pinnæ (leaflets) are of the same fan-shaped form and disposition as those of *A. F.-f. Friselliæ*, and the plant is of a particularly pleasing and compact habit. In the sub-variety *ramosum* (3, Fig. 97) we have a form in which the tip of the frond branches out into a broad, irregular, flat crest, sometimes 5in. broad, all the divisions bearing the contracted pinnæ peculiar to the typical plant.

A. F.-f. grandiceps—gran′-dic-eps (large-headed), *Moore.*

This exceedingly handsome and distinct variety, of medium size, was originally found wild near Nettlecombe, Somersetshire, and at Huish-Campflower, near Wiveliscombe. Its fronds, 1¼ft. to 1½ft. long and 3in. to 4in. broad, are lanceolate (spear-shaped) and furnished with somewhat distant pinnæ (leaflets) ending in small, very crispy crests. The chief characteristic is the very large, globose crest, 4in. to 5in. across and composed of a dense mass of narrow segments, which is found at the extremity of each frond, and the weight of which gives it a beautifully arched appearance.—*Lowe, Our Native Ferns*, ii., p. 57. *Nicholson, Dictionary of Gardening*, i., p. 130.

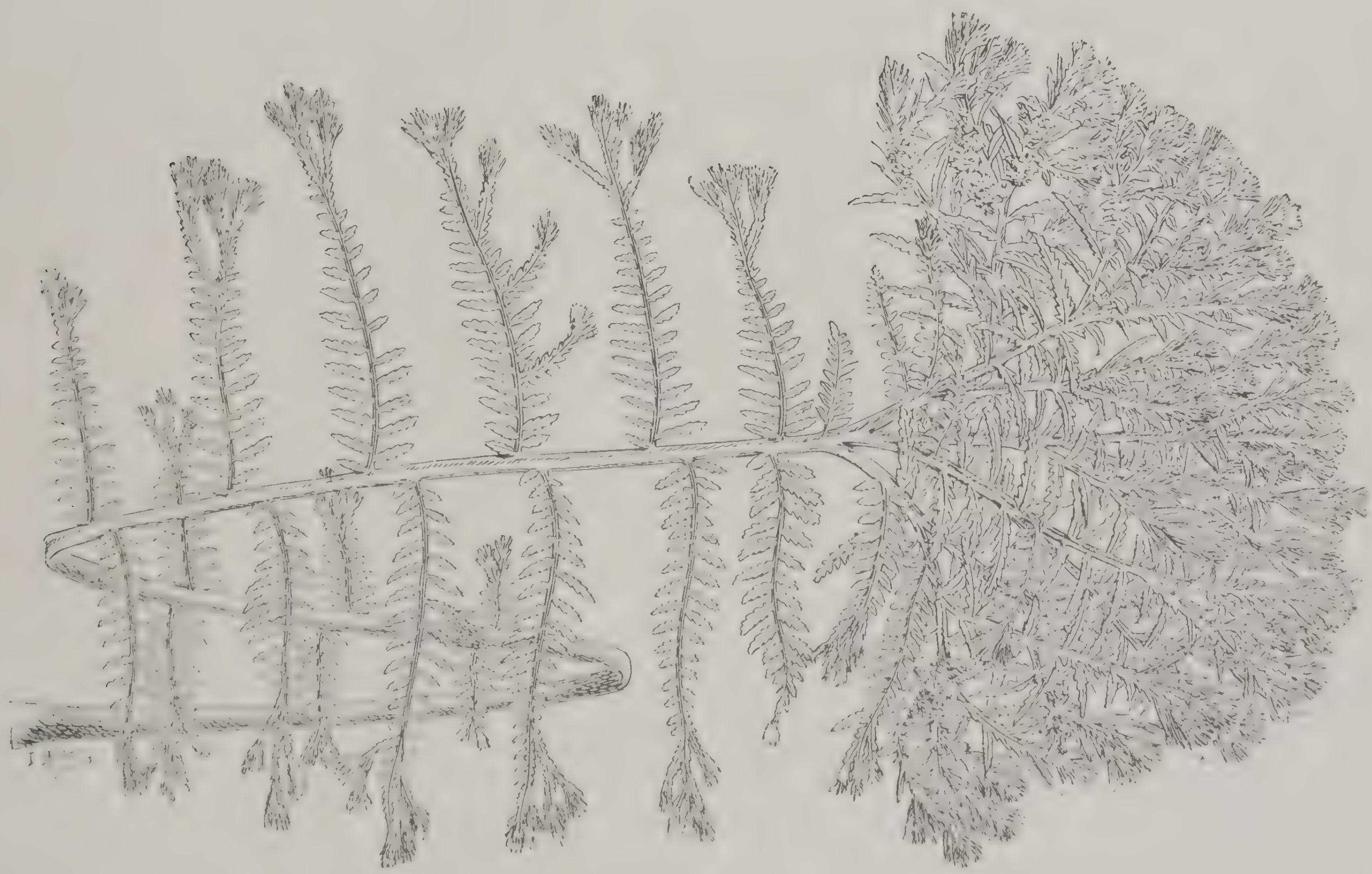


Fig. 98. Frond of Asplenium Filix-fœmina grandiceps
(⅔ nat. size).

A. F.-f. Grantiæ—Gran′-tĭ-æ (Grant's), *Moore.*

A very pretty and distinct, dwarf variety, found wild at Dale Abbey, and also near Sweden Bridge, Ambleside. Its pretty fronds, 9in. to 12in.

long and about 4in. broad, borne on short, stout stalks, are broadly oval in form and furnished with closely-set pinnæ, the divisions of which are imbricated (overlapping), thus forming densely leafy and crispy-looking fronds. A most pleasing character is also furnished by the margins of the leaflets being undulated and their points turned upwards, producing a prettily crimped and bristly appearance.—*Lowe, Our Native Ferns*, ii., p. 57, fig. 353. *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. incisum—in-ci′-sum (incised, cut), *Hoffmann.*

This large-growing and handsome variety, which we also find described under the same name by Sowerby, Moore, and Newman, is a widely-spread and not uncommon form, found wild at Penryn, in Cornwall; at Marwood and Bittadon, in Devonshire; at Nettlecombe, Somersetshire; at Bath; at Mayford, in Surrey; at Castle Malgwyn, in Pembrokeshire; at Chaigeley Manor, near Clitheroe, Lancashire; near Ambleside; in Teesdale; at Corby Castle, near Carlisle; in County Donegal, County Mayo, and County Dublin, at Killarney, and in other parts of Ireland. Its gigantic fronds, 4ft. to 5ft. long and when fully developed 1ft. broad, are broadly lanceolate (spear-shaped) and have a drooping and feathery appearance; they are furnished with ascending pinnæ (leaflets) 9in. to 10in. long, broad-oblong, tapering to a slender point, and the pinnæ in their turn are subdivided into pinnules (leafits) 1½in. long, ½in. broad at the base, and frequently so profoundly divided as to render the fronds almost tripinnate (three times divided to the midrib) and thoroughly distinct. The ultimate lobes are separated by sinuses (well-marked depressions) and toothed at the margin and at the point.—*Lowe, Our Native Ferns*, ii., p. 58, fig. 354.

A. F.-f. Jonesii—Jones′-ĭ-i (Jones's), *Moore.*

A very singular form, raised from spores, differing from nearly all, if not even all, other crested forms by having the crests of the pinnæ (leaflets) larger than the one at the extremity of the fronds. The fronds are 1ft. to 1½ft. long, oblong-spear-shaped in outline, twice divided to the midrib, and furnished at their summit with a small crest. The pinnæ, which are forked and heavily crested at their point, are subdivided into numerous narrow, toothed and slightly-crested pinnules (leafits). — *Nicholson, Dictionary of Gardening*, i., p. 130.

A. F.-f. laciniatum—lac-in-ĭ-a′-tum (fringed), *Moore.*

This interesting form, of dwarf habit, which was originally found at Nettlecombe, is, on account of the variable character of its fronds, a difficult plant to describe. These fronds, when perfect in outline, are somewhat spear-shaped, but they are usually furnished with very irregular pinnæ (leaflets), some being short, others tapering into a point, while a quantity of them are quite præmorse (bitten off) and terminate abruptly. The pinnules (leafits) are equally irregular, varying much in size and form, and are profoundly cut into sharp teeth. The sori (spore masses) are very abundant, and the plant reproduces itself pretty fairly from spores.—*Lowe*, *Our Native Ferns*, ii., p. 141, t. 39A.

A number of variations which somewhat differ from *A. F.-f. laciniatum* have been referred to that variety by T. Moore, the following being the most distinct and those best known in commerce:

A. F.-f. l. dissectum—dis-sec′-tum (deeply cut), *Moore.*

This exceedingly beautiful sub-variety, of dwarf habit, originally found in Newton Dale, near Whitby, Yorkshire, and subsequently near Levens, has, like *A. F.-f. laciniatum*, fronds rugged in outline and irregular, owing to the uneven lengths of the leaflets, which are subdivided into leafits that are less abbreviated and more regularly toothed, their teeth being bold, long, and narrow.—*Lowe*, *Our Native Ferns*, ii., p. 66, fig. 366.

A. F.-f. l. majus—ma′-jus (large) and **A. F.-f. l. minus**—min′-us (small), *Moore.*

These differ from *A. F.-f. laciniatum* through their dimensions. The former, originally found at Tunbridge Wells, has fronds 2ft. in length and comparatively very broad, depauperated (impoverished) in their upper half and more normal in the basal half. The latter, found at Ilfracombe, in Devonshire, is simply a dwarf *A. F.-f. laciniatum;* its fronds, deeply toothed and fringed, seldom exceeding 8in. in length.—*Lowe*, *Our Native Ferns*, ii., p. 65.

A. F.-f. l. Padleyi—Pad′-ley-i (Padley's), *Lowe.*

This charming form, originally found at Exeter, has fronds about 1¼ft. long and 6in. broad in their widest part, furnished with pinnæ (leaflets) descending to the centre of the frond and then slightly ascending to the apex, the upper ones being irregular in size and alternate (not opposite) from the base to the tip of the frond. The pinnules (leafits) are usually large and much cut, variable in shape and size, especially in the upper half of the frond, where they are extraordinarily laciniated. The sori (spore masses) are very irregular, and are sparingly distributed over the under-surface of the frond.—*Lowe, Our Native Ferns*, ii., p. 70, fig. 375.

A. F.-f. latifolium—la-tif-ol′-ĭ-um (broad-leaved), *Babington.*

This very handsome, vigorous-growing, though peculiar-looking variety was originally found near Keswick, Cumberland: it possesses the power of reproducing itself from spores. The fronds, of a peculiar dark green colour, attain 3ft. or more in length and are remarkable principally for the irregular outline of their leaflets, for the manner in which the pinnules (leafits) are crowded together, and for the peculiar disposition of the spore masses, which are small and curved and placed in two distinct lines half-way between the margin and the midvein. The pinnules are usually oblong-egg-shaped, overlapping, flat, and have their anterior side by far the longer; and their peculiarly-toothed margins give the entire frond a fimbriated (fringed) appearance.—*Lowe, Our Native Ferns*, ii., p. 6, fig. 278.

A. F.-f. minimum—min′-im-um (smallest).

A very dwarf variety, originally found at Ilfracombe. Its short fronds, 4in. to 6in. long and about 1in. broad, are bipinnate (twice divided to the midrib), spear-head-shaped, and furnished with somewhat irregular pinnæ (leaflets) that are oblong in form, with toothed lobes below and slightly dented above; the teeth being narrow and sharp, the dentation produces a fringed appearance. The short and irregular sori (spore masses) are mostly situated at the base of the pinnules.—*Lowe, Our Native Ferns*, ii., p. 31. *Nicholson, Dictionary of Gardening*, i., p. 30.

A. F.-f. Monkmanii—Monk-man′-ĭ-i (Monkman's), *Moore.*

This crested form, of irregular aspect, which makes a very handsome plant of somewhat erect habit and with pinnæ of a particularly expanded nature, was originally found growing on a bank near a well in Troutbeck village, near

Part of the Outdoor Fernery at Kew.

(The late Mr. Thomas Moore's Collection of Hardy Ferns.)

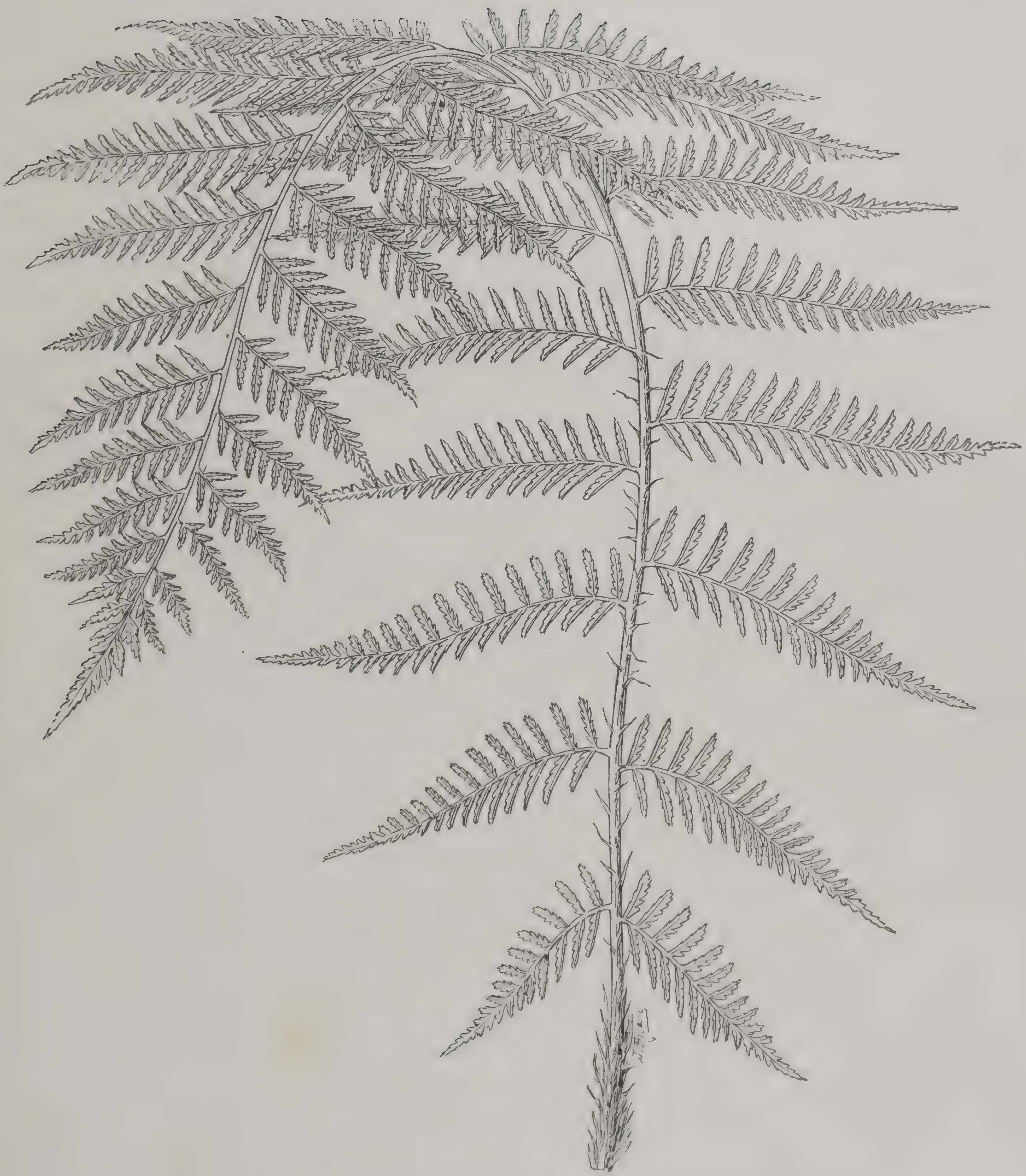


Fig. 99. Frond of Asplenium Filix fœmina incisum (p. 158)

(⅕ nat. size)

Ambleside. Its fronds, normal in outline but having their pinnules (leafits) broad, much crowded, and nearly overlapping, are all crested, but not regularly, some being massive and others more repeatedly forked. The pinnæ (leaflets) are also generally crested, but they vary in size and regularity.—*Lowe*, *Our Native Ferns*, ii., p. 10, figs. 282 and 283.

A. F.-f. Moorei—Moor′-ĕ-i (Moore's), *Lowe*.

A very pretty, multifid (much-cleft) variety, of dwarf habit, originally found in the Channel Islands, with fronds about 8in. long and 2½in. broad. The pinnæ (leaflets) are exceedingly irregular in size, varying from ½in. to 1½in. in length; the extremities of the larger ones are compactly multifid, while those of the smaller ones are only dilated. The summit of the frond is divided into four multifid branches, forming a wide, corymbiferous (clustered) head.—*Lowe*, *Our Native Ferns*, ii., p. 76, fig. 383. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. multifidum—mul-tif′-id-um (much-cleft), *Moore*.

This is one of the most beautiful, symmetrical, and graceful of the numerous crested forms known. Strange to say, it was found wild near Seven Churches, County Wicklow; in County Clare; in Killarney; also in the Lake District of Westmoreland, and in Scotland at the base of Ben Lawers. Its handsome fronds, which are from 2½ft. to 3ft. long and 10in. broad, are normal in habit, broadly spear-shaped, and somewhat lax. This variety is distinguished from all others by the extremities of all its leaflets being beautifully and regularly tasselled or repeatedly divided into narrow segments, and by the pale green colour of its fronds.—*Lowe*, *Our Native Ferns*, ii., p. 17, t. 36. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. orbiculatum—orb-ic-ul-a′-tum (round like a ball), *Lowe*.

Perhaps the finest and most interesting among the numerous varieties artificially raised from spores. It may be summarily described as a depauperated (impoverished) form, about 1ft. high, having all the appearance of a much-branched, rounded ball of green foliage about 4in. in width and almost as much in depth. The pinnæ (leaflets) are nearly opposite, some 1in., others not ¼in. in length; in many instances these organs are totally wanting. The pinnules (leafits) at their base are diminutive, in many cases only rudimentary, widening considerably as they advance towards the extremity of the frond, when they become branched. The frond itself terminates in a large, compact crest, repeatedly branching in an extraordinary manner, each branch or head terminating in a number of very narrow segments, giving to this conspicuous vegetable tassel a very delicate appearance.—*Lowe*, *Our Native Ferns*, ii., p. 127, fig. 465.

A. F.-f. plumosum—plu-mo′-sum (feathery), *Moore.*

This, undoubtedly the handsomest of the large-growing, non-crested forms of the Lady Fern, was found wild near Skipworth, in Yorkshire. Its beautiful fronds, 2½ft. long and 1ft. broad, are broadly spear-shaped and distinctly tripinnate (three times divided to the midrib); they are most exquisitely divided and have a very feathery appearance. The leaflets in the centre of the frond are 5in. to 6in. long and 2½in. broad; they are subdivided into overlapping pinnules (leafits), which are in their turn divided into distinct secondary pinnules ½in. long and very narrow, having sharp teeth. It is remarkable that in this variety the sori (spore masses) are destitute of the ordinary covering. Several sub-varieties are known in commerce, but none are so exceedingly light and elegant as the typical *plumosum.*—*Lowe*, *Our Native Ferns*, ii., p. 135. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. polyclados—pol-yc-la′-dos (many-branched), *Moore.*

This most curious and handsome variety was found near Ilfracombe and near Barnstaple, in Devonshire, also in Guernsey, and at Eccleston, in Lancashire. It is distinct from all other forms, for its large, spreading fronds, usually twin- or ramo-furcate (branched and then forked), have their leaflets more or less triangularly forked, but without any tendency to cresting. Some of the fronds are not branched, but show a peculiar warty contraction of the midrib, which causes the leaflets to crowd into masses on either side.—*Lowe*, *Our Native Ferns*, ii., p. 16, fig. 291.

A. F.-f. Pritchardii—Pritch-ar′-dĭ-i (Pritchard's), *Stansfield.*

A very elegant as well as curious form, originally found wild near Ruthin, in North Wales. It somewhat resembles *A. F.-f. Fieldiæ* as regards the cruciate (cross-like) character of its leaflets, but is totally distinct from that variety in the shape of its fronds, which, instead of being conspicuously truncate, form gracefully-curved lines as they taper gradually towards the extremity. These fronds attain a length of over 3ft., though little more than 1in. broad, and the habit of the plant is vigorous. The leaflets are cross-shaped and, for at least three-fourths of the length of the fronds, present the appearance of being knotted into small bows about ½in. in width.—*Lowe*, *Our Native Ferns*, ii., p. 114, fig. 448. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

There is a sub-variety named *cristatum*, which is finely crested at the extremities of the leaflets and bears a heavy, spreading crest at the summit of the fronds: it is very striking.

A. F.-f. ramosum—ra-mo′-sum (branched), *Wollaston*.

A very pretty variety, of small dimensions, its erect fronds seldom exceeding 9in. in length; their lower portion is furnished with small, irregular leaflets, sharply cut into finely-toothed leafits, each of them bearing at the end a small crest, which, unlike the terminal one, is not branched. The upper part of the frond is divided into two main branches, which are variously forked, and these sub-divisions are again multifid (much-cleft) and sharply toothed all round their edges.—*Lowe*, *Our Native Ferns*, ii., p. 86, fig. 401. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. scopæ—sco′-pæ (broom-like), *Lowe*.

This very handsome form was raised from spores of *A. F.-f. grandiceps*, to which it bears a slight resemblance, though quite distinct from that and indeed from any other crested variety. Its fronds, seldom more than 10in. long, are composed of a rachis (stalk) that is all but naked, for there are but a few scattered, irregular leaflets disposed from the base to the lower branching part of the frond; in some cases these leaflets are almost obsolete, whereas in others they are about 1in. long, with oblong, dentate pinnules (toothed leafits) and a heavy terminal crest. The upper portion of the frond is made up of repeated ramifications heavily crested, the whole forming a close, compact head about 4in. in diameter with a cuneate (wedge-shaped) base. The habit of the plant is almost perpendicular.—*Lowe*, *Our Native Ferns*, ii., p. 132, fig. 473. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. stipatum—sti-pa′-tum (stalked). Synonymous with *A. F.-f. Granticæ.*

A. F.-f. subcruciforme — sub-cruc-if-or′-mĕ (nearly cross-shaped), *Wollaston.*

A large-growing variety, more singular than beautiful; it is remarkable only for the almost cruciform shape of a portion of its pinnæ (leaflets), which are so variable as to be sometimes branching, forked, or more or less depauperated (impoverished). It was originally found at Whitbarrow.—*Lowe*, *Our Native Ferns*, ii., p. 88, fig. 405.

A. F.-f. sublunatum—sub-lu-na′-tum (nearly crescent-shaped).

A very curious and pretty, dwarf variety, with short, upright fronds 9in. to 12in. long and less than 1in. broad, furnished on their entire length with much-contracted, sparingly-divided, nearly crescent-shaped leaflets.—*Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. F.-f. tridentato-multifidum—trid-en-ta′-to–mul-tif′-id-um (three-toothed and much-cleft), *Lowe.*

This exceedingly handsome variety, which was raised from spores, is very distinct in appearance. Its massive fronds, 1½ft. long and about 8in. broad in their widest part, are borne on stout stipes (stalks) of a purplish colour and slightly scaly; they are regular in outline, being widest in the middle and narrowing rapidly to their summit and more gradually toward their base. The pinnæ (leaflets), linear-oblong in shape, are of thin texture and have their extremity forked more or less according to the position they occupy on the frond, the lower ones being more conspicuously forked than those on the upper portion of the frond. These pinnæ are divided into broad and deeply-cut pinnules (leafits) spreading at their extremity, thus forming numerous lobes, mostly tridentate, though only bidentate (twice toothed) when near the summit of the frond, which is repeatedly forked. The fructification is very abundant, every lobe from the base to the apex of the frond being soriferous (spore-bearing); the sori (spore masses) are crescent-shaped and provided with the usual covering, and are situated close to the midvein at the base of each lobe, mostly six or seven on each side.—*Lowe*, *Our Native Ferns*, ii., p. 90, fig. 409.

A. F.-f. uncum—un′-cum (hooked), *Moore.*

A most interesting variety, of slender habit and somewhat small dimensions, originally found wild in Levens Park. Its delicate fronds, about 10in. long and 3in. broad at their widest part, are furnished with about fifteen pairs of narrow leaflets divided into pinnules (leafits) that are cut down to the midrib and stand out prominently in various directions, being frequently bent back like a hook. The sori (spore masses) being situated near the midvein at the base of the denticulations, and therefore on the edge, give the plant the appearance of being suprasoriferous (bearing its spores on the upper surface).—*Lowe*, *Our Native Ferns*, ii., p. 91, fig. 411.

There is a sub-variety of the above called *uncum ramosum*, and differing from *uncum* only in its fronds being of larger dimensions and in their leaflets as well as their summit being branched.

A. F.-f. velutinum—vel-u-ti′-num (velvety), *Moore.*

This beautiful, densely-branched variety, raised from spores of *A. F.-f. acrocladon*, is of dwarfer habit than its parent. It is also more compact-growing, and this, coupled with the finely-divided character of the extremities of the leaflets, gives the plant the appearance of a ball of green velvet. The crested summit of each frond, when fully developed, is about 3½in. across.—*Nicholson*, *Dictionary of Gardening*, iv., p. 496.

A. F.-f. Vernoniæ—Ver-non′-ĭ-æ (Mrs. Vernon's), *Jervis.*

One of the most interesting, most distinct, and prettiest varieties known among non-crested forms of the Lady Fern, on account of its broad, semi-pinnatifid pinnules (leafits divided half-way to the rachis), which, like those of *A. F.-f. conioides* and *A F.-f. latifolium*, partake of a frilled character peculiar to few varieties only. This very decorative plant, which was originally found wild in Staffordshire, bears fronds 2½ft. or more in length and 4in. to 6in. broad; these are furnished with spear-shaped pinnæ (leaflets) somewhat closely set, especially in the upper portion of the frond, where they frequently overlap. The pinnules into which they are subdivided are egg-shaped, short-stalked, deeply-toothed, broad, leafy, and so deeply cut as to be nearly pinnatifid. When in a young state and only partially developed, this form somewhat resembles *conioides;* but in addition to the great difference in point of dimensions, as well as in other respects, of the two varieties when mature, their habits are altogether dissimilar, that of *Vernoniæ* being erect, whilst that of *conioides* is lax and spreading.—*Lowe*, *Our Native Ferns*, ii., p. 93, fig. 416.

A. F.-f. Victoriæ—Vic-to′-rĭ-æ (Victoria's), *Moore.*

This is not only the most extraordinary and the most curious, but also the most beautiful, of all the known forms of *A. Filix-fœmina*, for Moore, who named it and considered it worthy of that high distinction, made a remark which was very significative of the high opinion in which he held the plant. Dried fronds of it having been forwarded to him by Mr. J. Sadler, of Edinburgh (who himself had received them from various sources, all originating from the same plant), Mr. Moore, in answer, wrote him as follows: "The variety of *Filix-fœmina* is quite new, so far as I know, and is a very beautiful one. As a queen amongst Lady Ferns it would well bear to be called *Victoriæ*." Accordingly, it was published under that name in a list issued in March, 1865 (four years after its discovery), by Mr. P. Neill Fraser, of Cannonmills Lodge, Edinburgh, and later on in various catalogues, notably those of Messrs. A. Stansfield and Son, of Todmorden, Lancashire, and of Mr. R. Sim, of Foot's Cray, Kent. It was described in May, 1864, by the Editor of the *West of Scotland Horticultural Magazine;* but even the best of descriptions gives but a faint idea of the beauty of this plant, which was found accidentally—a large-sized and full-grown specimen—in 1861 by the side of a byway which runs along the margin of a wood on the Buchanan Estate, Stirlingshire, the property of the Duke of Montrose. Its lovely fronds, lanceolate (spear-shaped) in outline, about 1½ft. long and 5in. broad in their widest part, are furnished with pinnæ (leaflets) averaging 2½in. in length. The leaflets are most peculiarly formed, as their rachis (stalk of the leafy portion) divides close to the junction with the main stalk into twin leaflets, one of which ascends and the other descends at an angle of about 50deg.; each ascending leaflet therefore crosses the next two descending ones and *vice versâ*, thus forming a number of diamond-shaped spaces (Fig. 100). These leaflets are very narrow, and about 1in. below their extremity divide into three or four very narrow branches, which, like the summit of the frond itself, are several times forked and crested; they are subdivided into small pinnules (leafits) cut down to the midrib for half the length of the pinnæ and then decurrent to the apex (running down to their point), being there merely a row of small teeth on either side of the midrib.—*Lowe*, *Our Native Ferns*, ii., p. 97, fig. 423. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

It is worthy of notice that this particular form has never been found wild again either in the above-mentioned or in any other locality, and also that, although it produces spores most abundantly, no seedlings yet raised from it have been known to reproduce the typical form. In many instances the seedlings partake of some of the distinctive characters, but they all differ more or less, and it is through these repeated sowings that the variations *gracilis* and *lineare* have been obtained. The former of these two sub-varieties is distinguished by its more compact habit and by its narrower fronds, which are more heavily crested. The latter has very small but heavily-crested fronds and is extremely elegant.

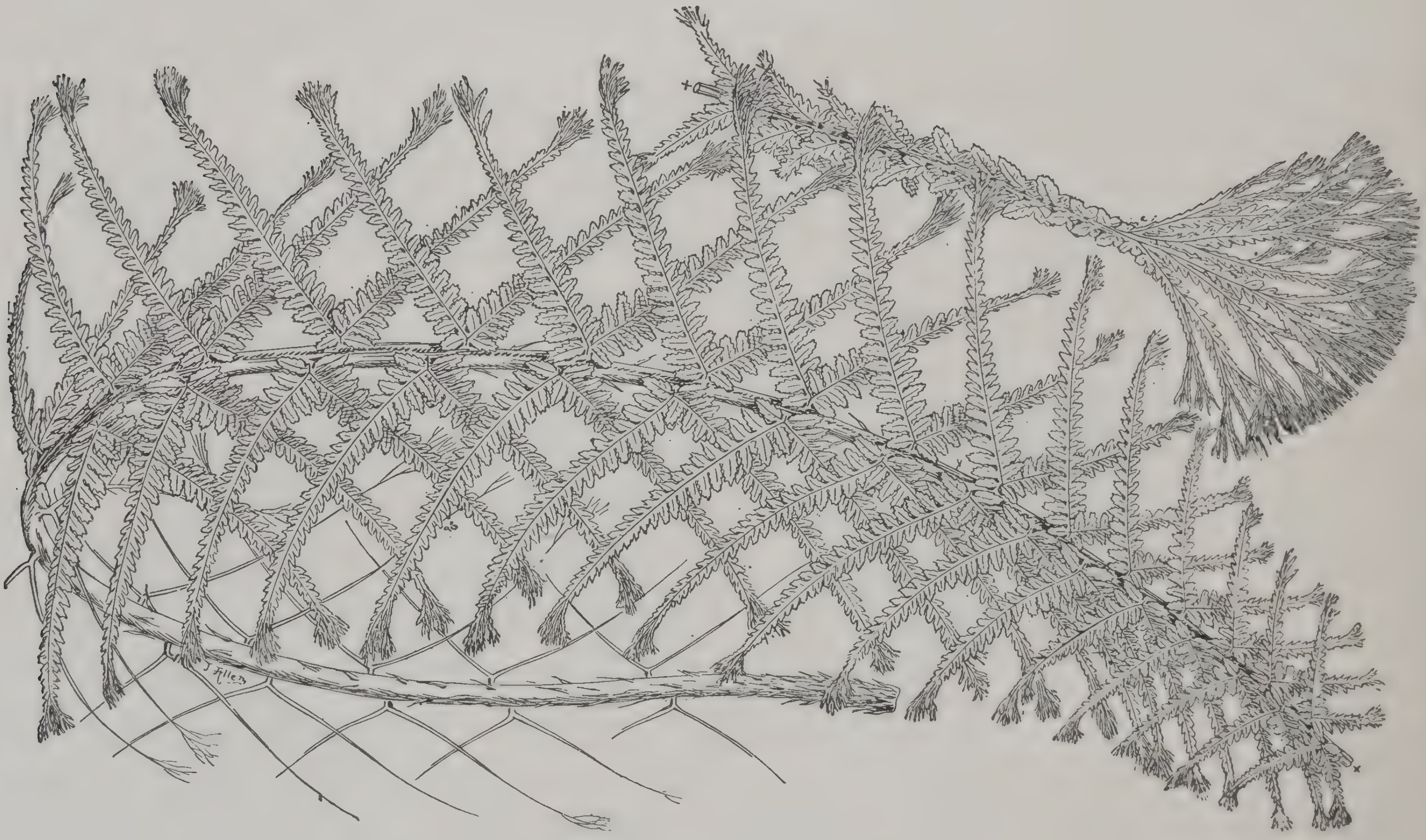


Fig. 100. Frond of Asplenium Filix-fœmina Victoriæ
(½ nat. size).

A. F.-f. Willisonii—Will-is-on′-ĭ-i (Willison's), *Willison.*

Although not so elegant as *Victoriæ* and some of the other varieties, this peculiar dwarf, distorted form, originally found wild near Whitby, is very interesting as illustrating a most singular mode of formation. Its fronds, about 10½in. long, are composed of stipes (stalks) 7in. long, covered with large reddish-brown scales at the base, and of a leafy portion about 3in. long by as much in width. Immediately below the basal leaflets the stalk becomes flattened out and distorted to an extraordinary degree, and this distortion continues to the extremity of the frond; the pinnæ (leaflets) and even the pinnules (leafits) branch in various ways, no two being alike; their lobes are narrow and deeply toothed.—*Lowe, Our Native Ferns*, ii., p. 95, figs. 419 and 420.

The varieties of the Lady Fern described in this book may appear very numerous, although comparatively they are but a few of the huge number of forms and variations described and figured in works devoted exclusively to the subject of British Ferns. They are, however, a selection of the most important and most distinct kinds, and are quite sufficient to give an idea of the extremely variable nature of such a species as *A. Filix-fœmina*, which is not known to produce, either spontaneously or artificially, such quantities of varieties in any of the other numerous countries where it is equally indigenous. Even America, according to Eaton ("Ferns of North America," ii., p. 76), only boasts of having the varieties *angustum*, *commune*, *cyclosorum*, *exile*, and *latifolium*, the last two of which are equally of British origin.

A. (Athyrium) fimbriatum—Ath-yr′-ĭ-um; fim-brĭ-a′-tum (fringed), *Hooker.*

A strong-growing, deciduous, greenhouse species, native of the Himalayas, where it is found at elevations of from 8000ft. to 9000ft. Its large fronds, 3ft. to 4ft. long and 1ft. to 1½ft. broad, are borne on firm, erect stipes (stalks) 1ft. or more long and clothed at their base with scales of a dark brown colour. The lower leaflets, of a soft, papery texture and about 9in. long and 3in. broad, are furnished with lanceolate (spear-shaped) leafits which in their turn are divided into distinctly-stalked, deeply- and sharply-cut segments provided with sharp teeth. The very numerous sori (spore masses) are closely set, broadly oblong in shape, and covered by a nearly kidney-shaped involucre.—*Hooker*, *Species Filicum*, iii., p. 234. *Beddome*, *Ferns of British India*, t. 295.

A. (Hemidictyum) Finlaysonianum—He-mid-ic′-tў-um; Fin′-lay-son-ĭ-a′-num (Finlayson's), *Wallich.*

A greenhouse species, native of the Himalayas and the Khasya Hills, where, according to Beddome, it was discovered by Dr. Thomson. Its fronds, of a coriaceous (leathery) texture and 1ft. to 1½ft. long, are borne on stipes (stalks) 6in. to 9in. long, green, and nearly naked; they are simply pinnate (only once divided to the midrib), being furnished with from two to six pairs of lateral leaflets, which terminate in a long, tapering point, but are very gradually narrowed towards the base to a distinct petiole (footstalk) and have their edge smooth. The sori (spore masses) are frequently 1½in. to 2in. long.—*Hooker*, *Species Filicum*, iii., p. 271. *Beddome*, *Ferns of British India*, t. 72.

A. (Euasplenium) firmum—Eu-as-ple′-nĭ-um; fir′-mum (firm-textured). Synonymous with *A. abscissum.*

A. (Euasplenium) fissum—Eu-as-ple′-nĭ-um; fis′-sum (cleft or split), *Kitson.*

This is a very pretty and well-marked species, of dwarf dimensions, native of the South of Europe; it luxuriates in either frame or greenhouse temperature. The little fronds, of a thin, papery texture and seldom more than 5in. long by 2in. broad, are borne on slender, naked stipes (stalks) 2in. to 6in. long, ebeneous (blackish) below, but of a bright green colour above; they are furnished on each side of the midrib with distant pinnæ (leaflets) divided into flabellato-cuneate (between fan-shaped and wedge-shaped) leafits, which are again pinnatifid (cut half-way down to the midrib). The linear-oblong sori (spore masses) occupy, when mature, the whole breadth of the segments of the pinnules, which are less than half-a-line in breadth.—*Hooker*, *Species Filicum*, iii., p. 177. *Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. (Euasplenium) flabellifolium—Eu-as-ple′-nĭ-um ; fla-bel-lif-ol′-ĭ-um (having fan-shaped leaflets), *Cavanilles.*

This extremely pretty, slender-growing, greenhouse species, which is of an evergreen nature, native of Temperate Australia, Tasmania, and New Zealand, is generally, though very wrongly, put aside by amateurs, its decorative merits being usually underrated by most Fern-cultivators. Yet it is well adapted for growing in baskets of small dimensions. It may also be used for covering the surface of the soil in small Fern-cases, as its fronds, of a brilliant green colour, borne on slender, flexuose (bending) stalks of a green and chestnut-brown colour and 3in. to 6in. long, are proliferous (bud-bearing) at their extremity, where they root very freely when in immediate contact with the soil ; they are only once divided to the midrib (Fig. 101) and have on each side from ten to fifteen sessile, flabellate pinnæ (stalkless, fan-shaped leaflets) about ½in. each way, of a thin papery texture, broadly lobed and sharply toothed on the edges, and with their base cut away on the lower side. The abundant spore masses are disposed close together, and when mature they become confluent (run into one another). —*Hooker, Species Filicum*, iii., p. 146. *Nicholson, Dictionary of Gardening*, i., p. 130. *Lowe, Ferns British and Exotic*, v., t. 1B.

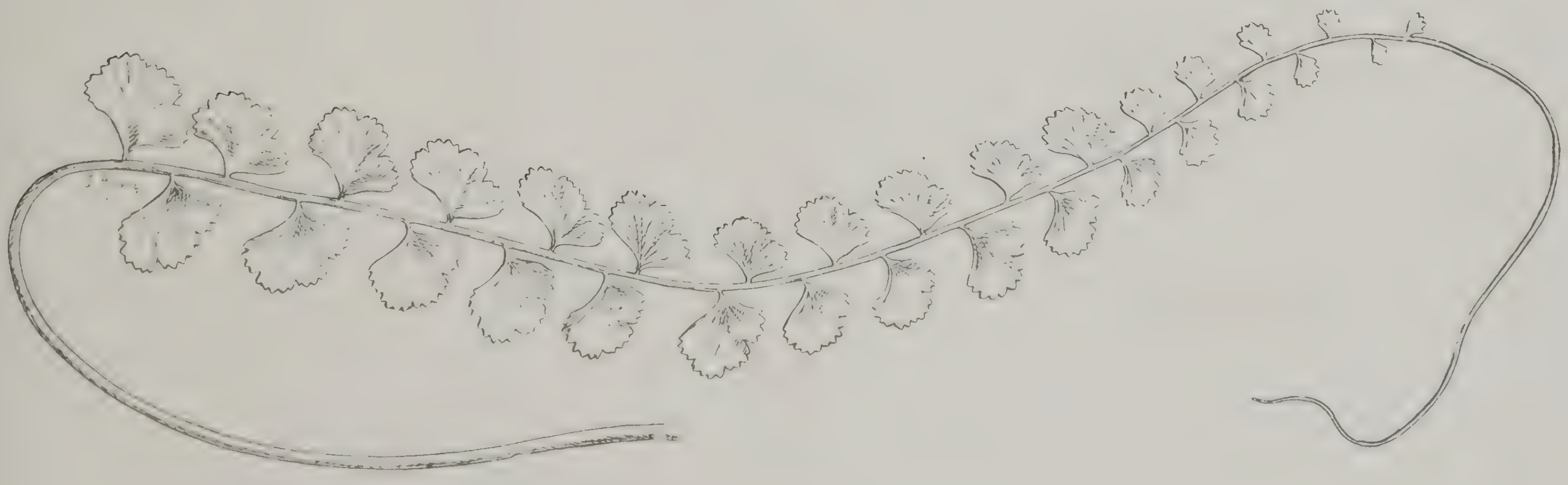


Fig. 101. Frond of Asplenium flabellifolium
(½ nat. size).

A. flabellifolium is a handsome plant when grown in a suspended basket ; its delicate and curious-looking fronds hanging round the sides have a very graceful, "weeping" appearance. In rustic cork baskets it is grown with most complete success, for it takes possession of the most ragged parts of them in a remarkably short time. Indeed, this is by far the most effective way of dealing with this little gem, which, when grown in pots or even trailing on the ground in a Fern-case, has a weedy and unprepossessing appearance. Yet this species is so thoroughly distinct that no collection should be without it.

A. f. majus—ma′-jus (large).

This is equally a greenhouse Fern, of Australian origin, but with fronds larger and furnished with broader leaflets than the one just described, of which it appears to be simply a larger form.—*Nicholson*, *Dictionary of Gardening*, i., p. 130.

A. (Darea) flaccidum—Da′-rĕ-a ; flac′-cid-um (relaxed), *Forster.*

This very variable, greenhouse, evergreen species, native of Australia, Tasmania, and New Zealand, is very justly one of the most appreciated of all the basket Ferns adapted to cool treatment, for which purpose it is admirably suited through the naturally pendulous habit of its fronds, which are produced in great abundance from one central crown. The fronds are from 2ft. to 3ft. in length, 4in. to 8in. broad, and are borne on stout, though flexible, greenish, naked stipes (stalks) 4in. to 8in. long ; these are furnished with numerous close or distant, lanceolate pinnæ (spear-shaped leaflets), of a thick, leathery texture and deep green colour, 4in. to 8in. long, ½in. to ¾in. broad, sometimes rather rigid and recurved, sometimes quite flaccid and drooping like the main stalk, occasionally deeply pinnatifid (cut down nearly to the midrib), but oftener cut down to the thick midrib into oblique or nearly sickle-shaped, narrow-linear lobes, upon which the sori (spore masses) are quite marginal.—*Hooker*, *Species Filicum*, iii., p. 205. *Nicholson*, *Dictionary of Gardening*, i., p. 130. *Lowe*, *Ferns British and Exotic*, v., t. 19.

Like *A. flabellifolium*, this is a Fern which should find a place in every collection. It is elegant in form and gains additional beauty and interest from its pendulous habit as well as through the numerous young plants with which the whole of the upper surface of its fronds is studded. A good specimen is an attractive object, the fronds hanging all round the plant so as to completely hide the pot in which it grows. This species prefers light peaty soil and is very averse to strong light.

A. (Diplazium) flavescens—Dip-laz′-ĭ-um ; fla-ves′-cens (yellowish), *Mettenius.*

A stove species, native of Cuba and Peru, distinguished from most other kinds by its nearly arborescent caudex (stem). Its fronds, of a bright green colour and 2ft. to 3ft. long by 1ft. to 1½ft. broad, are borne on firm, erect stipes (stalks) 1ft. or more long, of a brownish colour and nearly naked ; they are composed of a large terminal leaflet and ten to fifteen lateral ones of a somewhat coriaceous (leathery) texture, with the edges nearly entire or very slightly toothed and the base narrowed or rounded equally on both sides. The lower leaflets, which are stalkless or slightly stalked, 4in. to 8in. long and 1½in. to 2in. broad, terminate in a sharp point. The sori (spore masses) fall short of both the edge and the margin.—*Hooker*, *Species Filicum*, iii., p. 242.

A. (Diplazium) flexuosum—Dip-laz′-ĭ-um ; flex-ŭ-o′-sum (flexuose, bending in a zigzag manner), *Presl.*

This stove species, native of Peru, is of very singular habit, through its ample fronds, borne on firm, naked stalks of a brownish colour, being composed of leaflets with a very flexuose rachis and with pinnules (leafits) deflexed first and then curved upwards. The lower leaflets, of a sub-coriaceous (somewhat leathery) texture, are from 1ft. to 1½ft. long, 6in. to 9in. broad, and furnished with stalked pinnules 3in. to 5in. long, 1in. to 2in. broad, lobed in their upper part but cut down in their lower part quite to the stalk into oblong lobes. The long and very narrow sori (spore masses) are disposed in regular rows not reaching quite to the edge.—*Hooker*, *Species Filicum*, iii., p. 263.

A. fœcundum—fœ-cun′-dum (prolific). A popular name, synonymous with *A. compressum.*

A. fœniculaceum—fœ-nic-ul-a′-cĕ-um (Fennel-like). A variety of *A. fragrans.*

A. (Athyrium) foliolosum—Ath-yr′-ĭ-um ; fol-ĭ-ol-o′-sum (leafy), *Wallich.*

This distinct, stove, evergreen species, native of the East Indies, Java, and Ceylon, has fronds 1ft. to 1½ft. long, 6in. broad, and almost pendulous ;

they are lanceolate (spear-shaped) and bipinnate (twice divided to the midrib); the numerous leaflets are somewhat leathery, rather closely set, about 3in. long, shining and smooth, and their stalkless pinnules (leafits) are deeply cleft.—*Lowe, New and Rare Ferns*, t. 44.

A. (Euasplenium) fontanum—Eu-as-ple′-nĭ-um; fon-ta′-num (fountain-loving), *Bernhardi.*

This is undoubtedly one of the prettiest of the dwarf, compact-growing species contained in the genus. It is of very cosmopolitan habitat, as it is known to grow wild in various parts of France, Switzerland, Italy, Spain, Germany, and Siberia; according to Beddome it is also a native of the Himalayas; and it is now accepted as a British Fern (Moore's "Handbook of British Ferns," p. 150), for it has been found in a wild state in various and very distant localities, and it would be strange if in all these places it had been accidentally introduced by spores brought from the Continent. The first to announce it as a British Fern was Mr. Hudson, who, in the first edition of his "Flora Anglica," published in 1762, states that it grew "upon rocky places near Wybourn, Westmoreland." Then Bolton, in his "Filices Brittanicæ, or History of British Proper Ferns," published in 1786, states that this Fern was found on the walls of Agmondesham (Amersham) Church, in Buckinghamshire. Later on it was found on rocks in Wharncliffe Woods, Yorkshire; on an old wall on Tooting Common; on a wall at Ashford, near Petersfield, Hampshire; at Matlock, in Derbyshire; at Cavehill, near Belfast; on rocks near Stonehaven, in Kincardineshire; and in other localities. The comparative rarity of this species in England is accounted for by its being unable to withstand our climate except in sheltered and suitable situations.

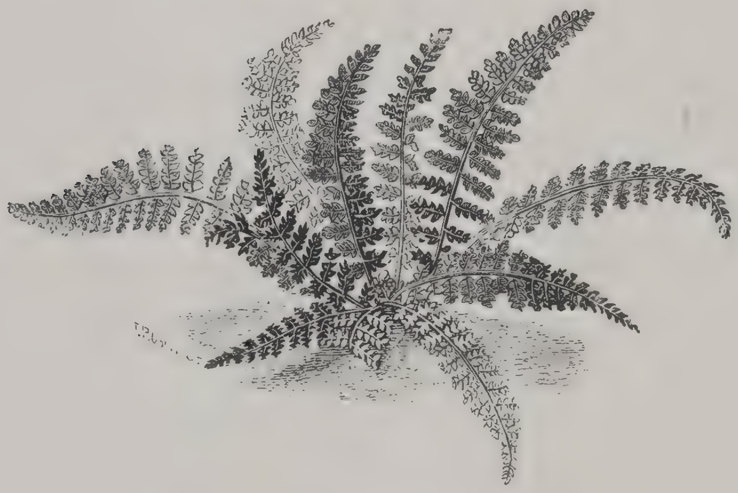


Fig. 102. Asplenium fontanum
(⅓ nat. size).

The fronds, 3in. to 6in. long including the slender, wiry, naked, greenish stalks on which they are borne, and about 1½in. broad, are oblong-spear-shaped, broadest above their middle, and tapering towards the base and the extremity (Fig. 102); they are furnished with numerous pinnæ (leaflets) of a dark green colour, about ½in. long, and cut down to the midrib into several pinnules (leafits) which are again pinnatifid (cut half-way down to their midrib). The margin of each lobe is deeply notched with from three to seven angular teeth. The plentiful sori (spore masses) are disposed from two to four on each pinnule, but when mature they become confluent and then cover nearly the whole of the under-surface of the frond.—*Hooker*, *Species Filicum*, iii., p. 193. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Lowe*, *Ferns British and Exotic*, v., t. 21B. *Beddome*, *Ferns of British India*, t. 146.

To grow *A. fontanum* to perfection and to preserve it evergreen it must be treated as an ordinary greenhouse Fern, have glass protection all the year round, and be shaded from the direct rays of the sun during the summer months. Like most of the close, dwarf-growing species, it is readily propagated by careful division of the plants during the spring months, when the portions thus obtained should be potted or planted in a mixture of sandy peat and broken bricks, or old mortar, or both; and particular attention should be paid to the drainage, which is best formed of freshly-broken bricks.

This pretty species has produced several varieties, such as *A. exiguum* of Beddome, found on the Neilgherries, which seems a less-divided form with narrow fronds and black stalks; and *A. Bourgæi* of Boissier, similar to *A. refractum* of Moore, with oblong, blunt leaflets cut down about half-way to the stalk into sharply-toothed lobes, most of them somewhat decurved; this latter is only known in cultivation, there being no record of its having been found in a wild state.

A. (Euasplenium) formosum—Eu-as-ple′-nĭ-um; for-mo′-sum (beautiful), *Willdenow*.

This elegant, delicate-looking, small-growing, evergreen, stove species, which, by the wiry, polished nature of its dark-coloured stalks, approaches the *Trichomanes* group, is a native of Tropical America, from Cuba and Mexico southward to Brazil and Peru; it is also found in Ceylon, and we have it on the authority of Beddome that it occurs in abundance in moist woods at high elevations on the Neilgherries. Leibmann, on the other hand, remarks that it is common in the temperate region on the east side of Mexico, growing in the forest on dry cliffs in cracks, or on dry, hard, clay earth in woods. Leibmann found it at Tepitongo, in the department of Oajaca, at an altitude of 5000ft.; also at Mirador, at Trapiche de la Concepcion, in the same department, at 3000ft. elevation, as well as in Potrero de Consoquitla, where it was growing at an altitude of 2500ft. Its lovely fronds, which are produced abundantly from a very short, upright stem, are of a papery texture and of a particularly light green colour; they are borne on very short, tufted, polished stalks, of a chestnut-brown colour, and measure from 1ft. to 1½ft. in length and about 1in. in breadth. The fronds are furnished with from twenty to thirty pairs of horizontal, sessile pinnæ (stalkless leaflets) ½in. long, deeply divided almost to the midrib on their upper edge, while their lower edge is cuneate (wedge-shaped) and forms a straight line. The short, narrow-oblong sori (spore masses) are disposed from one to four on each side of the

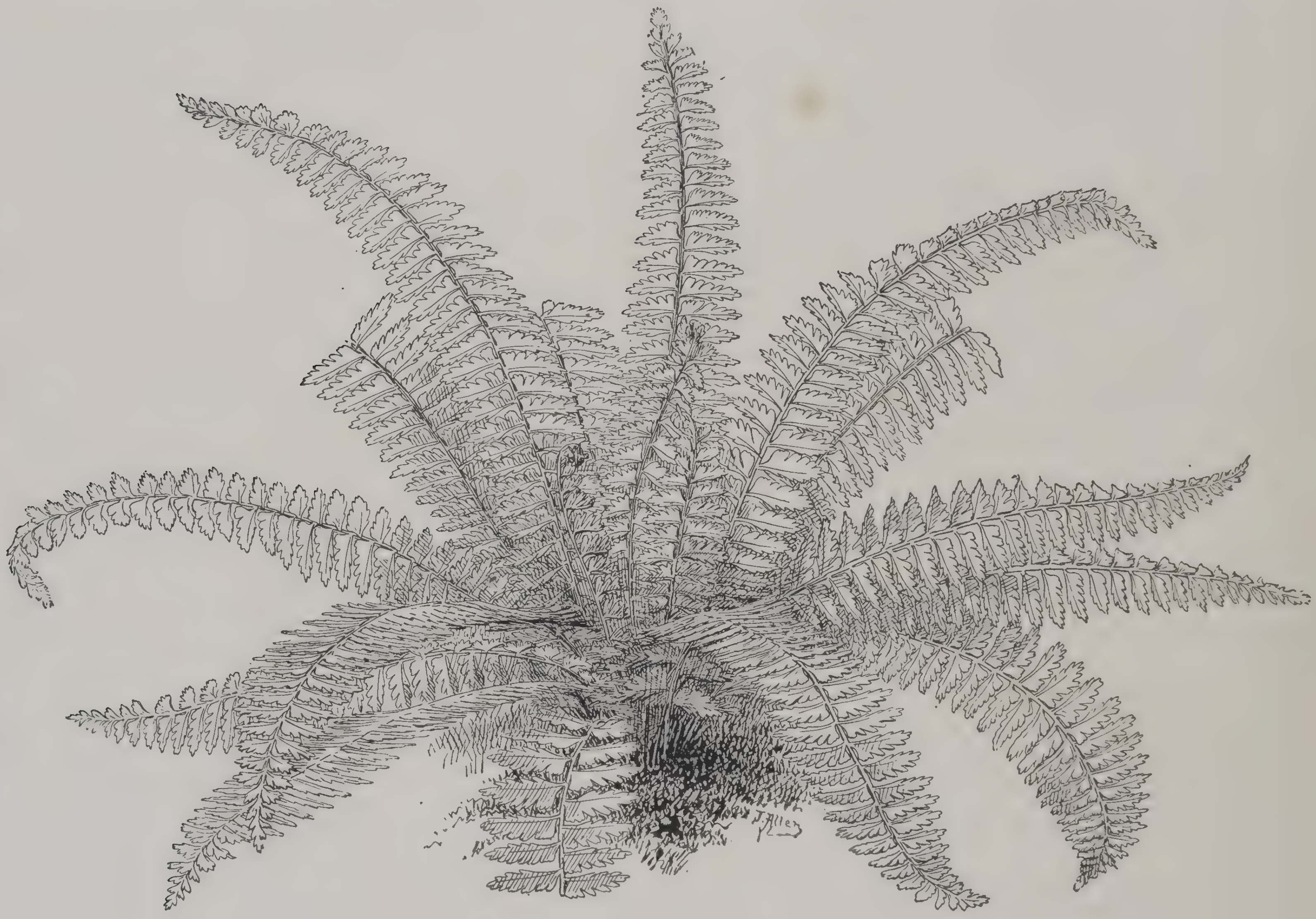


Fig. 103. Asplenium formosum
(⅓ nat. size).

midrib. See Fig. 103.—*Hooker, Species Filicum*, iii., p. 143. *Nicholson, Dictionary of Gardening*, i., p. 131. *Lowe, Ferns British and Exotic*, v., t. 43B. *Beddome, Ferns of Southern India*, t. 136.

A. formosum soon becomes a favourite with the Fern-lover. It is a species which does not like loam, but which is greatly benefited by a little crock-dust being added to the mixture of peat and sand.

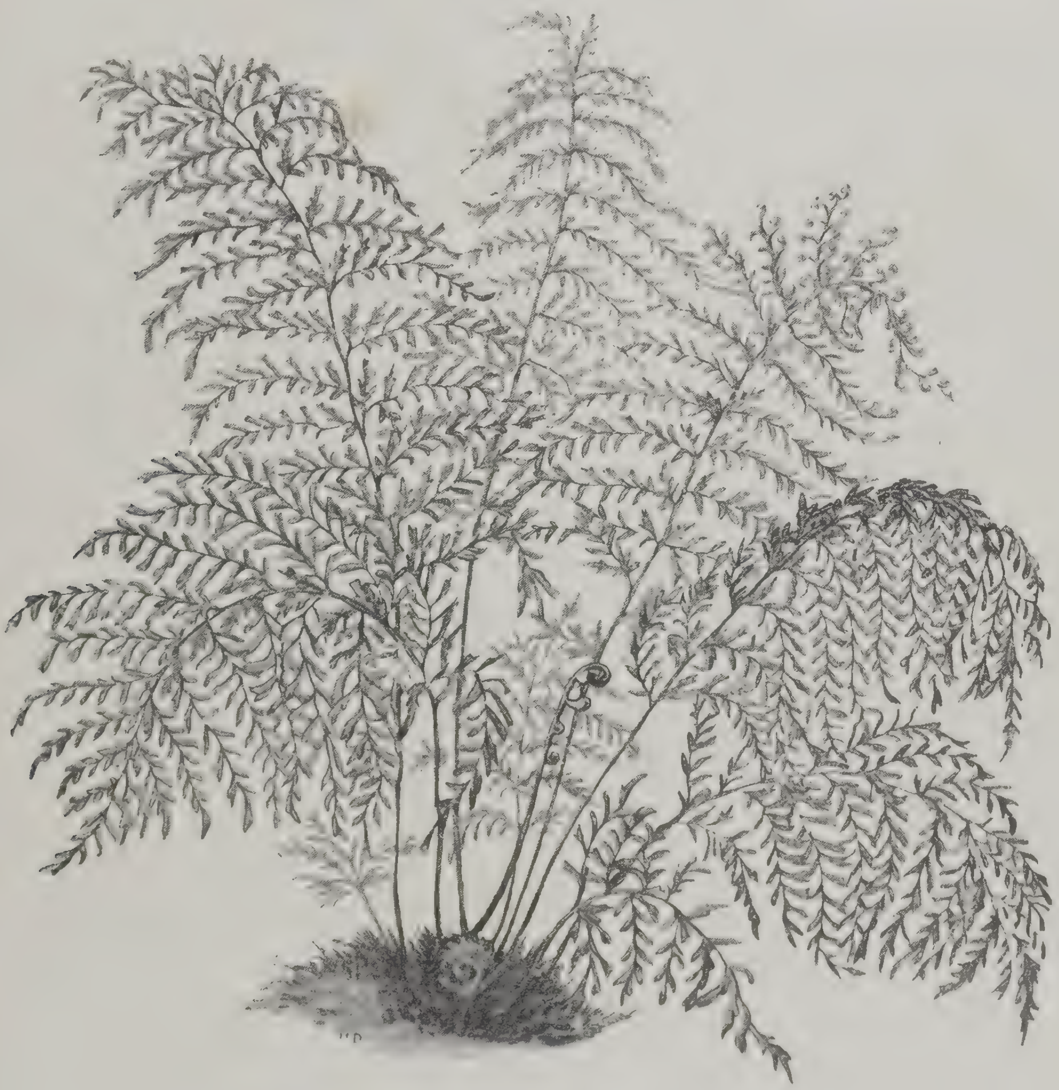


Fig. 104. Asplenium fragrans fœniculaceum
(⅓ nat. size).

A. (Euasplenium) fragile—frag′-il-ĕ (tender), *Presl.*

A dwarf, greenhouse species, native of Mexico and Peru, and very closely resembling *A. viride* in habit and texture, but with fronds sometimes proliferous at their extremity.—*Hooker, Species Filicum*, iii., p. 145.

A. (Euasplenium) fragrans—fra′-grans (fragrant), *Swartz.*

A very handsome, stove species, native of Tropical America, from Mexico and the West Indies to Peru and Brazil. Its fronds, of a leathery texture and bright green colour, 6in. to 9in. long and 3in. to 4in. broad, are borne on firm, naked, tufted stalks 4in. to 8in. long and of a brownish colour below; they are tripinnate (three times divided to the midrib), being furnished on each side with numerous closely-set pinnæ (leaflets), the lowest 3in. long and divided into spear-shaped pinnules (leafits) and then into segments only one line broad and toothed round the outer edge. The sori (spore masses) are very abundantly produced and so closely set as to cover the whole surface of the segments when mature.—*Hooker*, *Species Filicum*, iii., p. 181. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

A. f. fœniculaceum—fœ-nic-ul-a′-cĕ-um (Fennel-like).

This is the garden or popular name, for which we can find no authority, of a variety of the preceding species, from which it differs by having its fronds 10in. to 15in. long including stalks, only twice divided to the midrib (Fig. 104) and their ultimate segments much more finely divided.

A. (Diplazium) Franconis—Dip-laz′-ĭ-um; Fran-co′-nis (Franconis), *Mettenius*.

This stove species, native of Mexico, Guatemala, and Ecuador, is of somewhat large dimensions, its fronds, 1ft. to 2ft. long and 9in. to 15in. broad, being borne on firm, erect, greyish stalks 1ft. long and scaly below. The fronds are furnished with numerous leaflets, the lower ones about 6in. long, tapering to a point, and cut down in the lower half into distinct pinnules (leafits) of a peculiar shape owing to the midvein being much nearer their lower edge, which, like the upper one, is cut half-way down into sharply-toothed lobes (Fig. 105). They are of a papery yet firm texture and of a bright green colour. The sori (spore masses), disposed in parallel rows on the pinnules, do not quite reach the edge.—*Hooker*, *Species Filicum*, iii., p. 261. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

A. (Euasplenium) furcatum—Eu-as-ple′-nĭ-um; fur-ca′-tum (forked), *Thunberg*.

This extremely elegant, greenhouse species, of medium size, possesses a wide range of habitat, for it is found in Tropical America, from Mexico and the West Indies to Peru; in the Polynesian Islands and also in Australia, northwards to Tsus-Sima; and, according to Beddome, it is very abundant about Ootocamund, in the Neilgherries, and on the higher ranges of other lofty mountains on the western side of the Madras Presidency. Its fronds, 1ft. to 1½ft. long and 4in. to 6in. broad, are borne on firm, erect stalks 6in. to 8in. long and clothed with deciduous woolly hairs; they are furnished with from twelve to twenty pairs of leaflets 2in. to 3in. long, of a coriaceous (leathery) texture, and cut down throughout nearly or quite to the midrib into narrow-wedge-shaped pinnules (leafits), which are sharply toothed on their outer edge. The sori (spore masses) are very narrow and radiate from a common centre.—*Hooker*, *Species Filicum*, iii., p. 165. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Beddome*, *Ferns of Southern India*, t. 144.

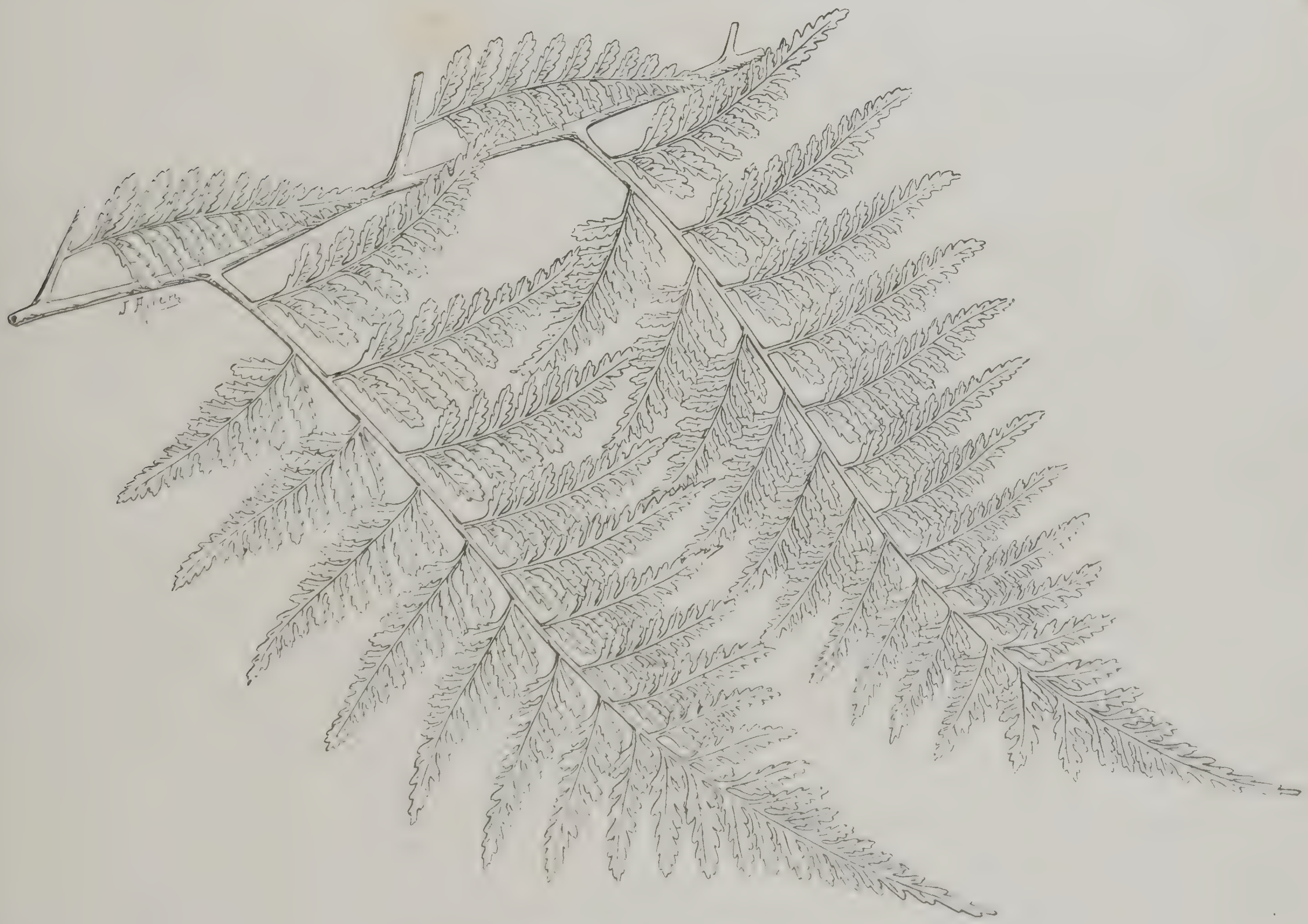


Fig. 105. Two Pinnæ of Asplenium Franconis

(⅔ nat. size).

A. Gardneri—Gard′-ner-i (Gardner's), *Baker*.

A stove species, from Ceylon, producing from a short-creeping rhizome (prostrate stem) lanceolate (spear-shaped) fronds 8in. to 12in. long, 3in. to

5in. broad, and often proliferous (bulbil-bearing) at their extremity; they are furnished with from six to ten pairs of ascending, spear-shaped leaflets of a thin but firm texture, with both surfaces of a bright green colour, the central ones 2in. to 3in. long and ½in. broad, toothed, square on the upper side and wedge-shaped on their lower side at the base. The sori (spore masses), ¼in. to ½in. long, are disposed in five or six pairs of parallel rows nearer the midrib than the edge.—*Hooker*, *Synopsis Filicum*, p. 485.

A. (Euasplenium) Gautieri—Eu-as-ple′-nĭ-um; Gau-tĭ-e′-ri (Gautier's), *Hooker.*

This stove species, native of the Island of Nissobe, near Madagascar, is the smallest and most delicate of the group composed of plants with entire (undivided) fronds. Its fronds are oblong-spear-shaped, only about 3in. long and 1in. broad in their widest part, and have their base suddenly narrowed to a wing which narrows very gradually into the stalk; the base is sometimes furnished with a pair of small, oblong, blunt lobes. The small and distant sori (spore masses) do not reach either the edge or the midrib.—*Hooker*, *Species Filicum*, iii., p. 88, t. 184.

A. (Euasplenium) gemmiferum—Eu-as-ple′-nĭ-um; gem-mif′-er-um (provided with leaf-buds), *Schrader.*

A stove species, of medium size, native of Cape Colony, Bourbon, Mauritius, and Madagascar, and closely resembling the popular *A. obtusatum* in general appearance, but with fronds of a more papery texture and generally proliferous (bulbil-bearing) at their extremity. The copious sori (spore masses) are broad and fall short of both edge and midrib.—*Hooker*, *Species Filicum*, iii., p. 100.

A. (Euasplenium) germanicum—Eu-as-ple′-nĭ-um; ger-ma′-nic-um (German), *Weiss.*

This species, of small dimensions, which approaches nearest the better-known Wall Rue (*A. Ruta-muraria*) and is even considered by some authors as merely a variety of that common British Fern, is a native of Hungary, Sweden, Germany, France, Italy, and other parts of the Continent, where, however, it is always found in comparatively small quantities. It was not until about 1792, when it was discovered on some rocks in the South of Scotland by a Mr. Dickson, who published the fact in the second volume of the Linnean Society's "Transactions," that *A. germanicum* was acknowledged as a British plant. It has been found also on rocks on the River Tweed, near Kelso, Roxburghshire; on the Stenton Rocks, near Dunkeld, in Perthshire; and near Dunfermline, in Fifeshire. In England it has been collected at Borrowdale, in Cumberland; on Kyloe Crags, Northumberland; and in Carnarvonshire, North Wales. Sowerby, in his work on the "Ferns of Great Britain," says that in 1854 two plants were found by a Mr. W. Hawker on a precipice near Scawfell, and that it had also been collected near Llanrwst and in the Pass of Llanberis. In all the above-named localities this singular Fern was, as on the Continent, only found in small quantities,

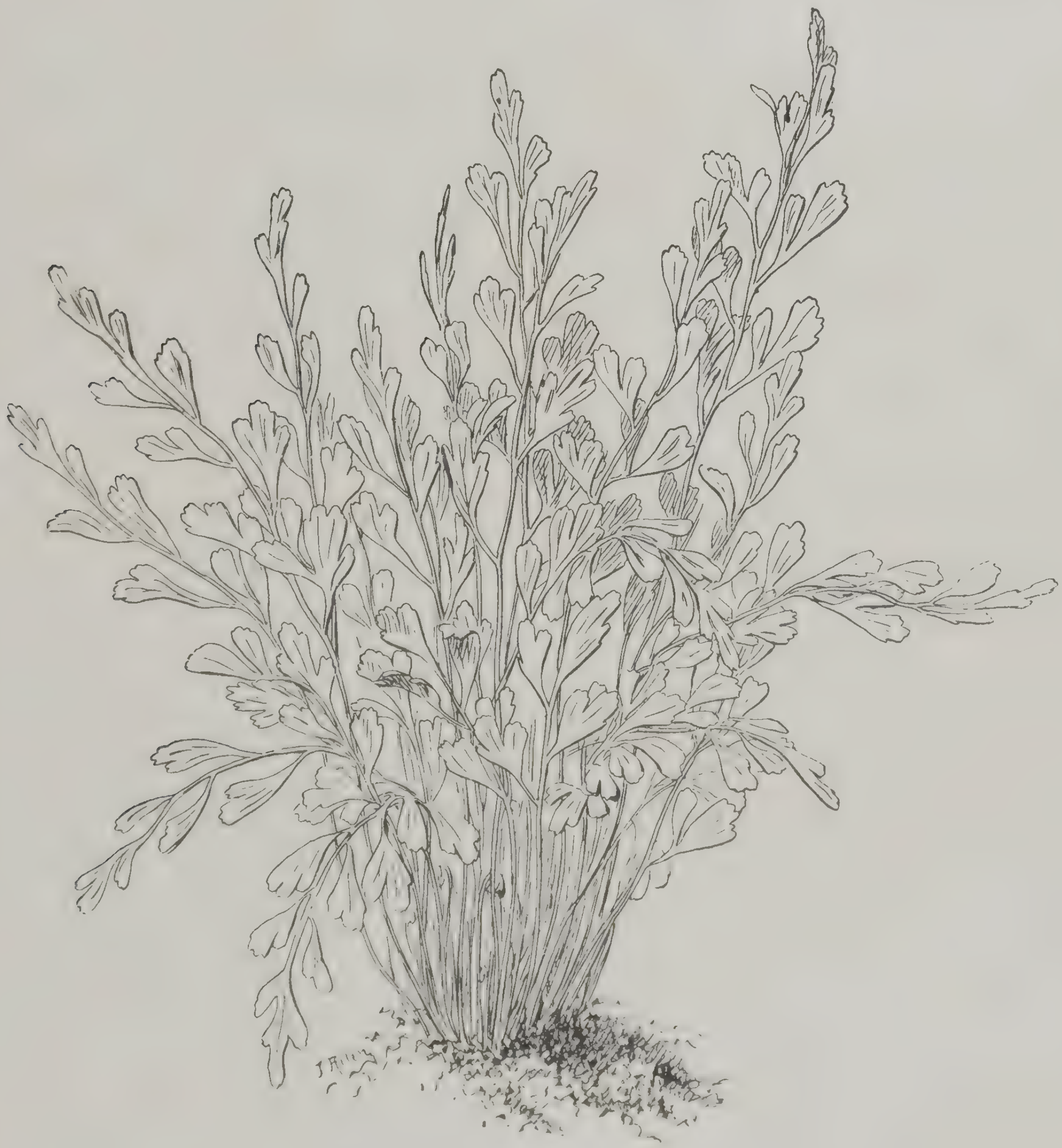


Fig. 106. Asplenium germanicum
(⅔ nat. size).

and generally in company with *A. Ruta-muraria.* Its fronds, 2in. to 3in. long and borne on naked, slender, and densely-tufted stalks 2in. to 4in. long, are very variable and simply pinnate (only once divided to the midrib). The pinnæ are alternate (not opposite), of a leathery texture, and once or twice forked at their extremity (Fig. 106); the lowest of them are deeply cleft and also slightly notched towards the point. The spore masses are linear, when mature covering the whole breadth, but falling short of the point, of the pinnæ. *A. alternifolium* is another name for this species.—*Hooker, Species Filicum*, iii., p. 175. *Nicholson, Dictionary of Gardening*, i., p. 131. *Lowe, Ferns British and Exotic*, v., t. 3B.

A. germanicum is perfectly hardy; in a wild state its fronds die down during the winter, but when cultivated in a greenhouse from which frost is excluded, it remains evergreen. It requires a very light, poor soil, and it has been found to thrive best and most permanently when grown in a mixture of equal proportions of sharp river sand, sandy peat, and lime rubbish, with thorough drainage, subjected to moderate waterings, and protected from bright sunshine during the summer.

A. (Hemidictyum) Ghiesbreghtii—He-mid-ic′-tў-um; Ghies-bregh′-tĭ-i (Ghiesbreght's), *Fournier.*

A stove species, native of Mexico, with leathery, pale green fronds 1½ft. long and 1½in. broad at the middle, spear-shaped, entire (undivided), gradually narrowed upwards from the middle to a sharp point and downwards to a short stalk. The narrow sori (spore masses) are about 1in. long and form an angle of 10deg. with the midrib, near which they are situated. —*Hooker, Synopsis Filicum*, p. 492.

A. (Euasplenium) Gibertianum—Eu-as-ple′-nĭ-um; Gib-ert-ĭ-a′-num (Gibert's), *Hooker.*

A strong and regular-growing, stove species, native of Paraguay, with fronds about 8in. long, caudate (tailed) at their extremity, and furnished with numerous closely-set leaflets of a thin, papery texture, broadest on the upper side and cut down to the midrib into simple, sharp-pointed pinnules (leafits). The sori (spore masses) are disposed one at the base of each pinnule. —*Hooker, Species Filicum*, iii., p. 199.

A. (Diplazium) giganteum—Dip-laz′-ĭ-um ; gig-ant-e′-um (gigantic). Synonymous with *A. radicans.*

A. (Diplazium) Glasiovii—Glas-i-o′-vĭ-i (Glaziou's). A synonym of *A. herbaceum.*

A. (Euasplenium) Glenniei—Glen′-nie-i (Glennie's), *Baker.*

A greenhouse species, of dwarf dimensions, native of Mexico. Its fronds are bipinnate (twice divided to the midrib), 3in. to 4in. long, bearing from twenty to twenty-five pairs of spear-shaped, blunt leaflets somewhat resembling those of *A. fontanum* in their sub-divisions, which are of a slightly leathery texture and green colour. The oblong sori (spore masses) are disposed one at the base of each pinnule (leafit).—*Hooker*, *Synopsis Filicum*, p. 488.

A. (Diplazium) Godichaudii—Dip-laz′-ĭ-um ; God-ĭ-chaud′-ĭ-i (Godichaud's), *Mettenius.*

A stove species, of arborescent habit, native of the Island of Rawak. Its ample fronds are tripinnatifid (three times divided half-way to the midrib), being furnished with oblong, spear-shaped leaflets 1ft. long, and sessile pinnules (stalkless leafits) 2½in. long, ½in. broad, strap-shaped, cut down to a narrow wing into bluntly-toothed segments, upon which the more than usually thick sori (spore masses) are conspicuously disposed.—*Hooker*, *Synopsis Filicum*, p. 491.

A. (Athyrium) Goringianum pictum—Ath-yr′-ĭ-um ; Gor-in′-gĭ-a′-num pic′-tum (Goringe's painted), *Mettenius.*

This remarkably pretty, greenhouse species, popularly known as *Athyrium Goringianum tricolor*, is a native of Japan, and is said to be quite hardy in sheltered positions ; but to have it in perfection, so that none of its beautifully-coloured foliage shall be damaged by late frosts, cold winds, &c., it is necessary to give it at least the protection of a cold frame. It is distinguished from all other members of the genus by the bright colour of its fronds, which are entirely deciduous ; they are from 10in. to 15in. long, spear-shaped, and pendulous. The numerous leaflets are divided into sharply-toothed pinnules (leafits), on which the oblong or sometimes kidney-shaped sori (spore masses) are abundantly disposed in two rows parallel to the costa (midvein). The stalks on which they are borne, claret-coloured in their entire length, form a pleasing and striking contrast to the bright grey colour of the pinnæ next on each side, which disposition forms a central grey band running through the whole length of the frond, and is as effective as in the better-known *Pteris quadriaurita tricolor.*—*Hooker*, *Synopsis Filicum*, p. 227. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

The soil which best suits this species is a compost of two parts of leaf mould, one of fibrous loam, and one of silver sand. Although spores are produced in abundance, the plant is usually propagated by division.

A. (Diplazium) gracilescens—Dip-laz′-ĭ-um; grac-il-es′-cens (very graceful), *Mettenius.*

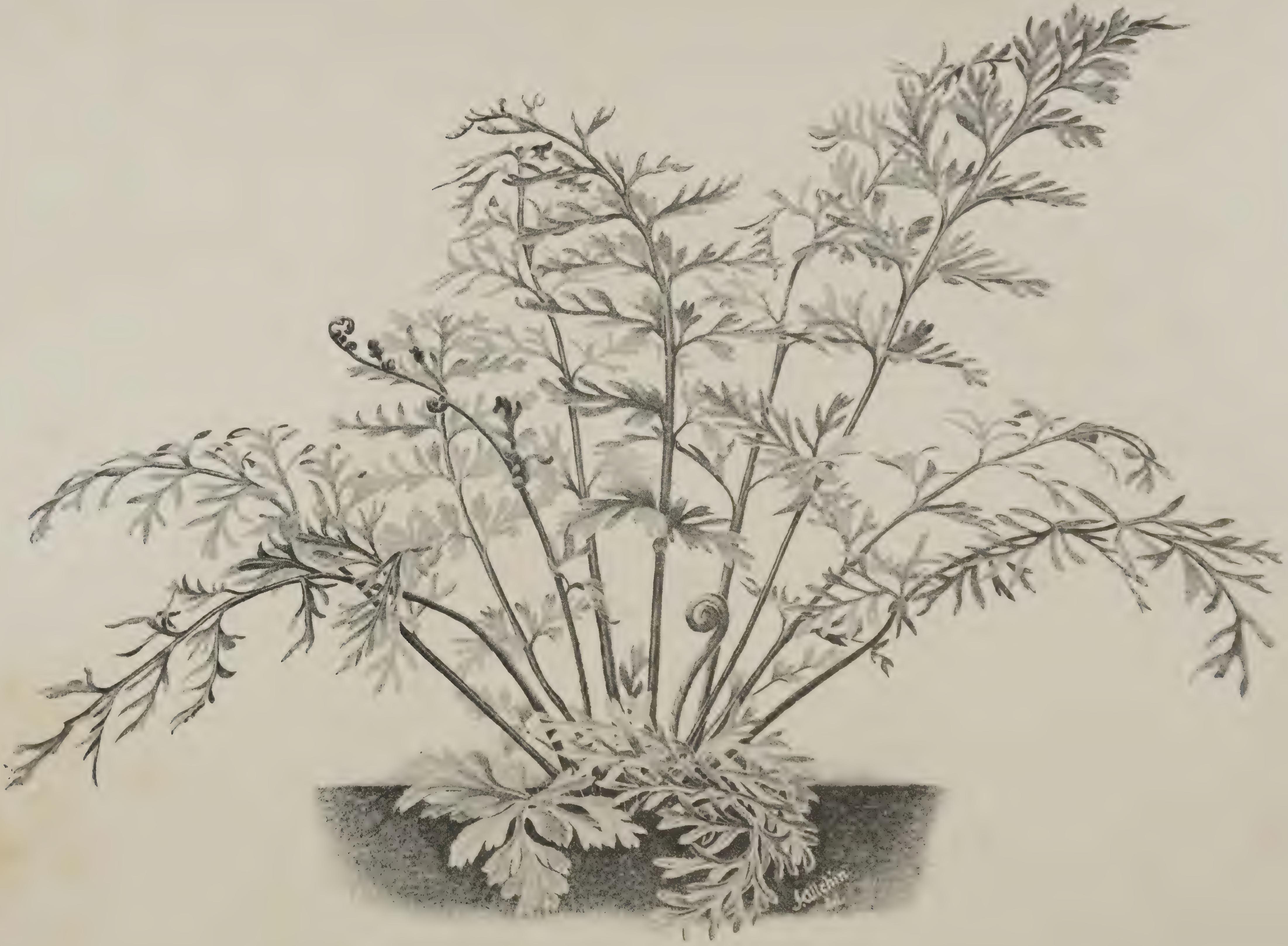
A stove species of large dimensions and very ornamental, native of Venezuela. Its large yet elegant fronds, 3ft. to 4ft. long, 2ft. to 3ft. broad, and fully tripinnate (three times divided to the midrib), are borne on slender but firm, straw-coloured stalks of a polished nature. The lower leaflets, 1ft. to 1½ft. long and 6in. broad, are divided into close, short-stalked leafits 2in. to 3in. long and 1in. broad, which are in their turn subdivided into oblong, unequal-sided, pinnatifid, segments, each bearing only one sorus (spore mass) about one line long.—*Hooker*, *Synopsis Filicum*, p. 242.

A. (Diplazium) grammitoides — Dip-laz′-ĭ-um; gram-mi-tŏ-i-dēs (Grammitis-like), *Hooker.*

A dwarf-growing, stove species, from the Philippine and Malay Islands, with fronds only about 6in. long, lanceolate (spear-shaped), and bipinnatifid (twice divided half-way to the midrib). The oblong sori (spore masses) are mostly disposed in an oblique row close to the midrib of the leaflets.—*Hooker*, *Species Filicum*, iii., p. 228.

A. (Diplazium) grandifolium—Dip-laz′-ĭ-um; gran-dif-ol′-ĭ-um (large-leaved), *Swartz.*

This is a strong-growing, stove species, found from Cuba to Ecuador and Brazil. Its ample fronds, 2ft. to 3ft. long and 9in. to 12in. broad, are borne on firm, erect, naked or slightly scaly stalks 1ft. or more long and of an ebeneous (blackish) colour; they are simply pinnate (only once divided to the midrib), being furnished with from twelve to twenty pairs of leaflets, the



Asplenium rutæfolium.
(¼ nat. size).

lower ones 2in. or more apart. The leaflets are 4in. to 6in. long, 1½in. broad, distinctly stalked, and while they terminate in a sharp point, they are sometimes broadly lobed below, their base being equally rounded on both sides and their edge slightly toothed. Near their point the fronds, which are of papery texture and of a deep green colour, are generally pinnatifid (divided only half-way to the midrib). The irregular sori (spore masses) fall slightly short of both midrib and edge.—*Hooker*, *Species Filicum*, iii., p. 241. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

A. (**Thamnopteris**) **Grevillei**—Tham-nop′-ter-is ; Grev-il′-lĕ-i (Greville's), *Wallich.*

A greenhouse species, of medium dimensions, native of Tavoy and Mishmee, in India, and one of the few kinds belonging to the section with simple fronds, of which the Bird's-Nest Fern (*A. Nidus*) is a good and popular representative. Its fronds, 1ft. to 1½ft. long and 2in. to 3in. broad, of a leathery texture, are of an elongated spear-head shape being narrowed to a sharp extremity and gradually below to a broad wing to the stalks, which become very gradually narrower downwards. The sori (spore masses) in most cases extend to within a short distance of the edge. See Fig. 107 (reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author).—*Hooker*, *Species Filicum*, iii., p. 80. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Beddome*, *Ferns of British India*, t. 66.

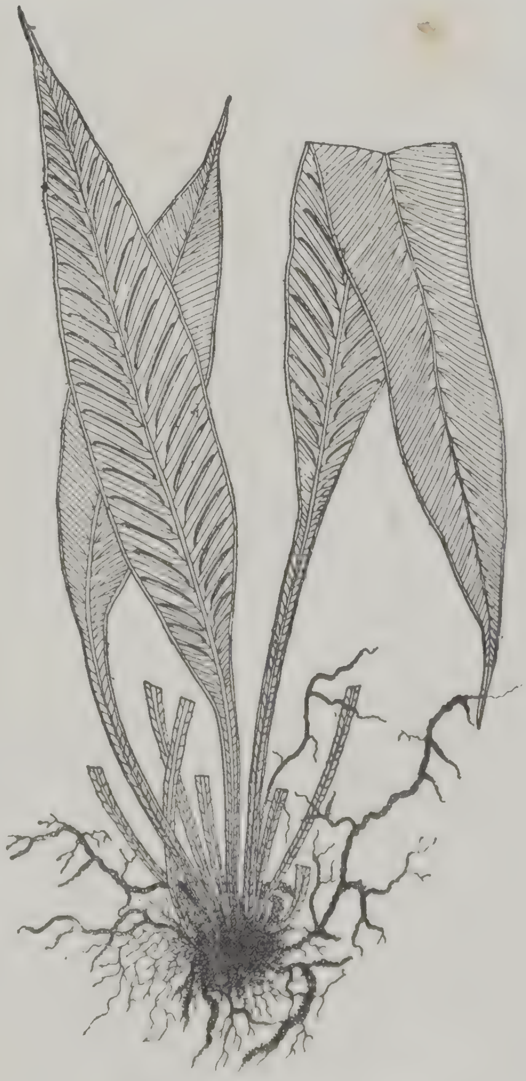


Fig. 107. Asplenium Grevillei
(¼ nat. size).

A. (**Euasplenium**) **Griffithianum**—Eu-as-ple′-nĭ-um ; Grif-fith-ĭ-a′-num (Griffith's), *Hooker.*

This cool-greenhouse species, native of Assam and Sikkim, where it is found up to 4000ft. elevation, is easily recognised in the group of simplefronded species to which it belongs by the distinctly crenated (notched) character of the margins of its spear-shaped, leathery fronds. These fronds are 6in. to 9in. long and about 1in. broad, sharp-pointed at their summit but very gradually narrowed below. The abundant sori (spore masses) reach from the midrib two-thirds of the way to the edge.—*Hooker*, *Species Filicum*, iii., p. 87, t. 928. *Beddome*, *Ferns of British India*, t. 58.

A. Hallerii—Hal-le′-rĭ-i (Haller's). A common garden appellation for *A. fontanum.*

A. (Euasplenium) Hallii—Eu-as-ple′-nĭ-um ; Hal′-lĭ-i (Hall's), *Hooker.*

A very pretty, stove species, native of Ecuador and the Amazon Valley, and one of the few which are proliferous (bulbil-bearing) at the extremity of their fronds only. These fronds, 6in. to 12in. long and at most 2in. broad, are furnished with numerous horizontal leaflets, the lower ones of which are deflexed, 1in. long, and peculiar in having their point bluntly rounded. They are of a papery texture and dark green colour. The sori (spore masses) are disposed in two rows.—*Hooker*, *Species Filicum*, iii., p. 202.

A. Hancei—Han′-cĕ-i (Hance's). Synonymous with *A. crinicaule.*

A. (Euasplenium) hastatum—Eu-as-ple′-nĭ-um ; has-ta′-tum (halbert-shaped), *Klotzsch.*

A greenhouse species, of small dimensions, native of Columbia and Ecuador, and one which somewhat resembles *A. abscissum* and *A. auriculatum.* Its fronds, 6in. to 12in. long and 3in. to 4in. broad, are borne on stalks 4in. to 6in. long, firm, erect, greyish, and scaly below ; they are oblong-spear-shaped and are furnished with eight to twelve pairs of subsessile pinnæ (almost stalkless leaflets) 1½in. to 2in. long, about ½in. broad, sharply pointed, with their edge deeply toothed throughout and the two sides unequal ; the texture is somewhat leathery. The distant sori (spore masses) fall short of both edge and midrib.—*Hooker*, *Species Filicum*, iii., p. 116, t. 172.

A. (Euasplenium) Hemionitis — Eu-as-ple′-nĭ-um ; He-mĭ-on-i′-tis (Hemionitis), *Linnæus.*

This very distinct, greenhouse species, perhaps the most striking of all the known species with lobed fronds, is a native of Madeira, the Canaries, the Azores, and Teneriffe; it is much more commonly known by the name of *A. palmatum* on account of the peculiar shape of its fronds, which are borne on firm, naked, dark-coloured stipites (stalks) 4in. to 8in. long. These fronds, 4in. to 6in. each way, usually 10in. high, and of a papery texture, are composed of a triangular, sharp terminal lobe and of two large, cordate (heart-shaped), pointed lateral ones, which are again sometimes bluntly, sometimes acutely, lobed at the base, and these basal lobes on each side overlap one another and the stalk. The very abundant sori (spore masses) affect the form of a narrow line about 1½in. long, disposed on each vein, giving the fronds the appearance of being striped in long lines all over their under-surface. This plant must not be mistaken for the West Indian *Hemionitis palmata*, for, while there is a great similarity in names, which has caused a certain amount of confusion, there does not exist the slightest analogy between the two subjects, unless it is simply in the ivy-leaved shape of their fronds. — *Hooker*, *Species Filicum*, iii., p. 91. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Lowe*, *Ferns British and Exotic*, v., t. 6.

This singular Fern, as pretty as it is curious, has produced two quite distinct varieties: *A. H. cristatum*, in every respect resembling the species, with the addition of a large crest at the extremity of each frond; and *A. H. multifidum* (see Plate), the fronds of which are quite as broad as they are long and have their main divisions again freely divided or deeply cut, which gives them quite a fringed outline.

A. (**Diplazium**) **herbaceum** — Dip-laz′-ĭ-um: her-ba′-cĕ-um (soft), *Baker.*

An arborescent, stove species, native of Rio Janeiro. Its ample fronds are four times pinnatifid (cut down half-way to the midrib) and are furnished with pinnæ (leaflets) of a soft texture and from 1½ft. to 2ft. long. The pinnæ are divided into distinctly-stalked, spear-shaped, bright green pinnules (leafits) 4in. to 6in. long and 1in. to 2in. broad; and the latter are again cut into stalkless pinnatifid segments with close, blunt lobes. The sori (spore masses), about one-and-a-half lines long, touch the midrib but fall short of the edge. This species is also known as *A. Glasiorii.* — *Hooker*, *Synopsis Filicum*, p. 492.

A. (Euasplenium) heterocarpum—Eu-as-ple′-nĭ-um; het-er-oc-ar′-pum (various-fruited), *Wallich.*

This very distinct and well-marked, stove species, which in habit resembles a dimidiate Adiantum, is a native of the Malayan Peninsula, Borneo, and Ceylon, and is also, according to Beddome, found wild on the Travancore Hills, on the Neilgherries. Its fronds, 6in. to 15in. long and 1½in. to 2in. broad, are borne on firm, erect stalks 4in. to 9in. long, of a chestnut-brown colour and polished; they are furnished with numerous closely-set, dimidiate pinnæ (leaflets fully developed on one side of the midrib and scarcely at all on the other) about 1in. long and ¼in. broad. The lower edge of the pinnæ is quite entire, while their upper edge, broadest towards the base, is deeply cleft throughout (Fig. 108). The sori (spore masses) are disposed one, rarely two together, on each tooth or lobe.—*Hooker*, *Species Filicum*, iii., p. 132, t. 175. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Beddome*, *Ferns of Southern India*, t. 131.

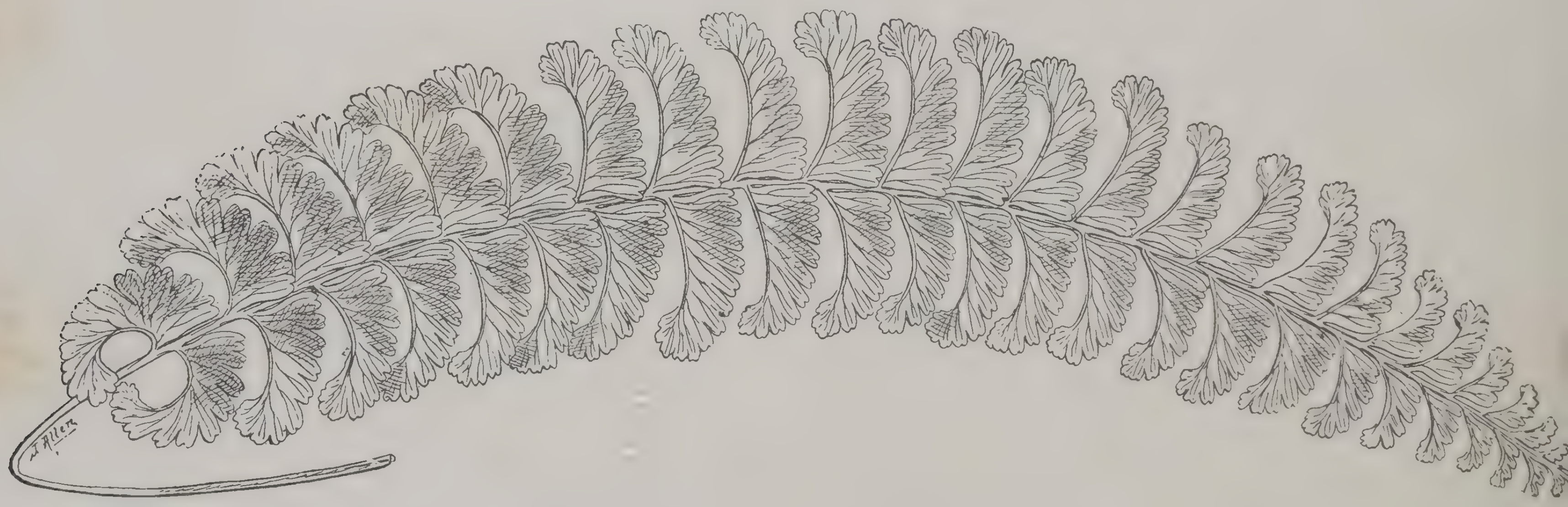


Fig. 108. Frond of Asplenium heterocarpum
(nat. size).

A. heterodon—het′-er-od-on (variously toothed). Synonymous with *A. vulcanicum.*

A. (Diplazium) hians—Dip-láz′-ĭ-um; hĭ′-ans (gaping), *Kunze.*

This strong-growing, almost arborescent, stove species is a native of the West Indies and Ecuador. Its gigantic fronds, 3ft. to 4ft. long and 2ft. to 3ft. broad, borne on stalks 1ft. to 1½ft. long and slightly scaly, are furnished with leaflets of a thin, papery texture and dark green colour; the lower leaflets, 1ft. or more in length and 4in. to 6in. broad, are divided into numerous spear-shaped pinnules (leafits) with blunt lobes, reaching nearly down to the stalks. The sori (spore masses) are short, oblong in shape, the lower ones only being double.—*Hooker*, *Species Filicum*, iii., p. 233.

A. (Euasplenium) hirtum—Eu-as-ple′-nĭ-um; hir′-tum (hairy), *Kaulfuss.*

A stove species, of medium growth, native of Madagascar, Mauritius, the Philippine and the Solomon Islands, and, according to Beddome, also found in Burmah, Penang, and Java. Its fronds, 1½ft. to 2ft. long, 4in. to 8in. broad, and borne on strong, erect, brownish stalks 2in. to 4in. long and very hairy, are furnished with numerous horizontal, leathery pinnæ 2in. to 3in. long and about ½in. broad, sharply pointed, broadly but not deeply toothed on their edge, and conspicuously auricled (eared) at their base on the upper side. The sori (spore masses) are disposed in two regular rows, which fall considerably short of the edge.—*Hooker*, *Species Filicum*, iii., p. 149, t. 191. *Beddome*, *Ferns of British India*, t. 194.

A. (Athyrium) Hohenackerianum—Ath-yr′-ĭ-um; Ho-hen′-ack-er-ĭ-a′-num (Hohenacker's), *Kunze.*

A very distinct, greenhouse species, native of Ceylon and Scinde, and, according to Beddome, not uncommon on the Neilgherries and Anamallays, and very abundant from the plains up to 4000ft. elevation in Coorg and South Canara. Its fronds, borne on firm, erect stalks 2in. to 4in. long and clothed throughout with linear scales, are about 9in. long, 3in. broad, and furnished with numerous spear-shaped pinnæ (leaflets) of a papery texture and light green colour, cut down to the midrib into toothed pinnules (leafits). The oblong sori (spore masses) are plentifully produced.—*Hooker*, *Species Filicum*, iii., p. 220. *Beddome*, *Ferns of Southern India*, t. 150.

A. (Euasplenium) Hookerianum—Eu-as-ple′-nĭ-um; Hook-er-ĭ-a′-num (Hooker's), *Colenso.*

This pretty, small-growing, greenhouse species, native of New Zealand, has much the appearance of our native *A. Ruta-muraria*, at least so far as the shape of the pinnæ and pinnules (leaflets and leafits) is concerned, but their texture is thinner and their stipites (stalks) are terete (long and round) and not flattened. Its fronds, seldom more than 8in. long and 4in. broad, are borne on slender, greenish stalks 2in. to 3in. long; they are provided with several pairs of distinctly-stalked leaflets sometimes 1½in. to 2in. long, with several stalked pinnules ¼in. each way, of a papery texture and each bearing from three to five sori (spore masses).—*Hooker*, *Species Filicum*, iii., p. 194.

A. Hookerianum (Hooker's), *of gardens*. A name applied to the popular *A. Colensoi*, a totally different plant to that just described.

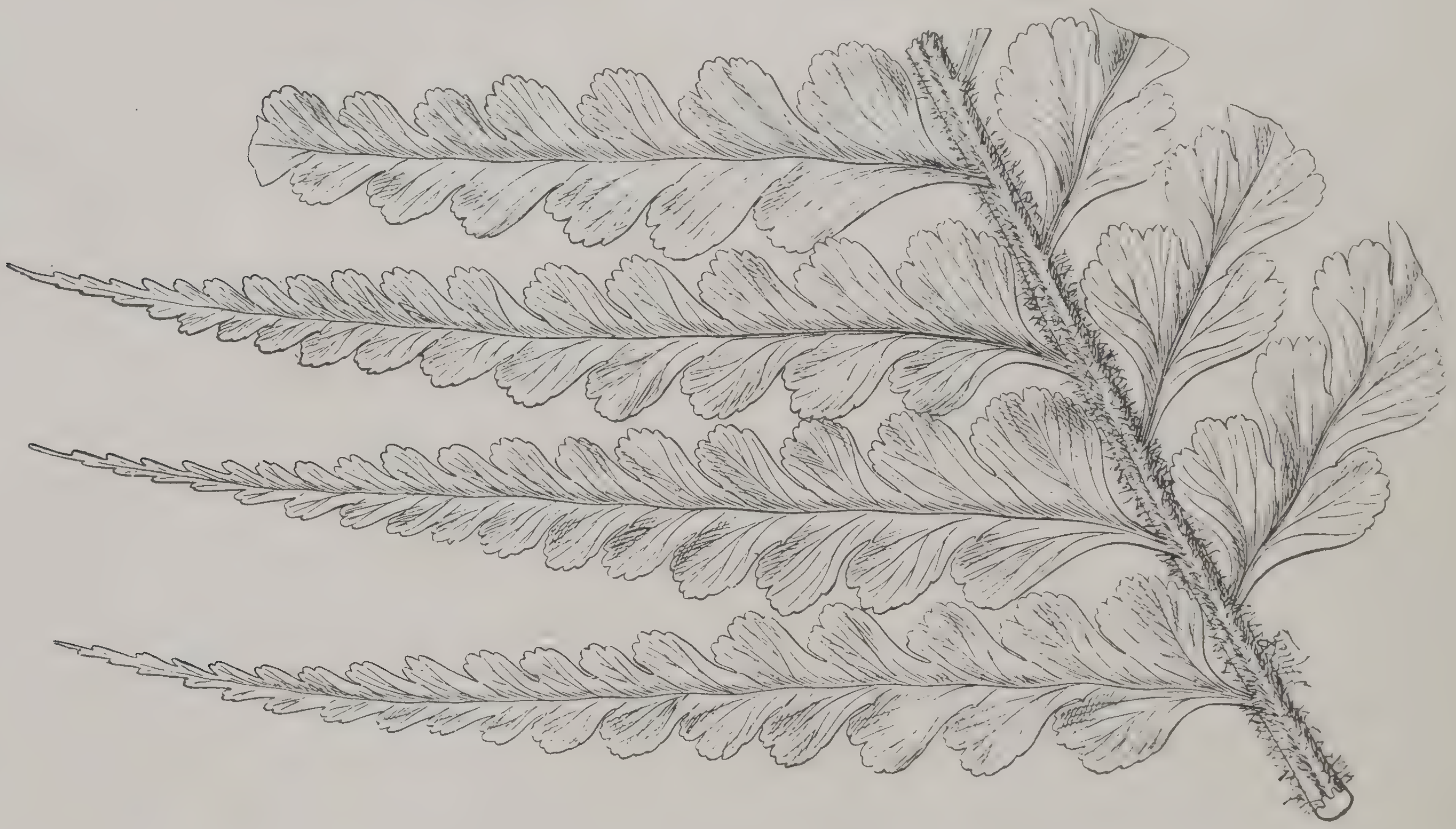


Fig. 109. Portion of Frond of Asplenium horridum
(nat. size).

A. (Euasplenium) horridum—Eu-as-ple′-nĭ-um; hor′-rid-um (horrid), *Kaulfuss*.

This is a strong-growing, distinct, and, notwithstanding its name, very decorative, stove species, native of Java, Samoa, and the Sandwich Islands. Its robust fronds, 2ft. to 3ft. long and 8in. to 12in. broad, are simply pinnate (only once divided to the midrib). The leaflets, 4in. to 6in. long and ¾in. broad at the base, gradually taper to a sharp point and are cut down throughout more than half-way to the midrib into nearly uniform lobes that are heart-shaped or broadly rounded at the base on the upper side, forming a broad curve on their lower side (Fig. 109). The texture is leathery and the sori (spore masses) are disposed in two nearly parallel lines close to the midrib; a few are also scattered on the disk of the lobes. The most distinctive character of this curious species resides in the rusty-brown colour of the hairs densely covering the footstalks on which the fronds are borne.—*Hooker, Species Filicum,* iii., p. 153, t. 193. *Nicholson, Dictionary of Gardening,* iv., p. 496.

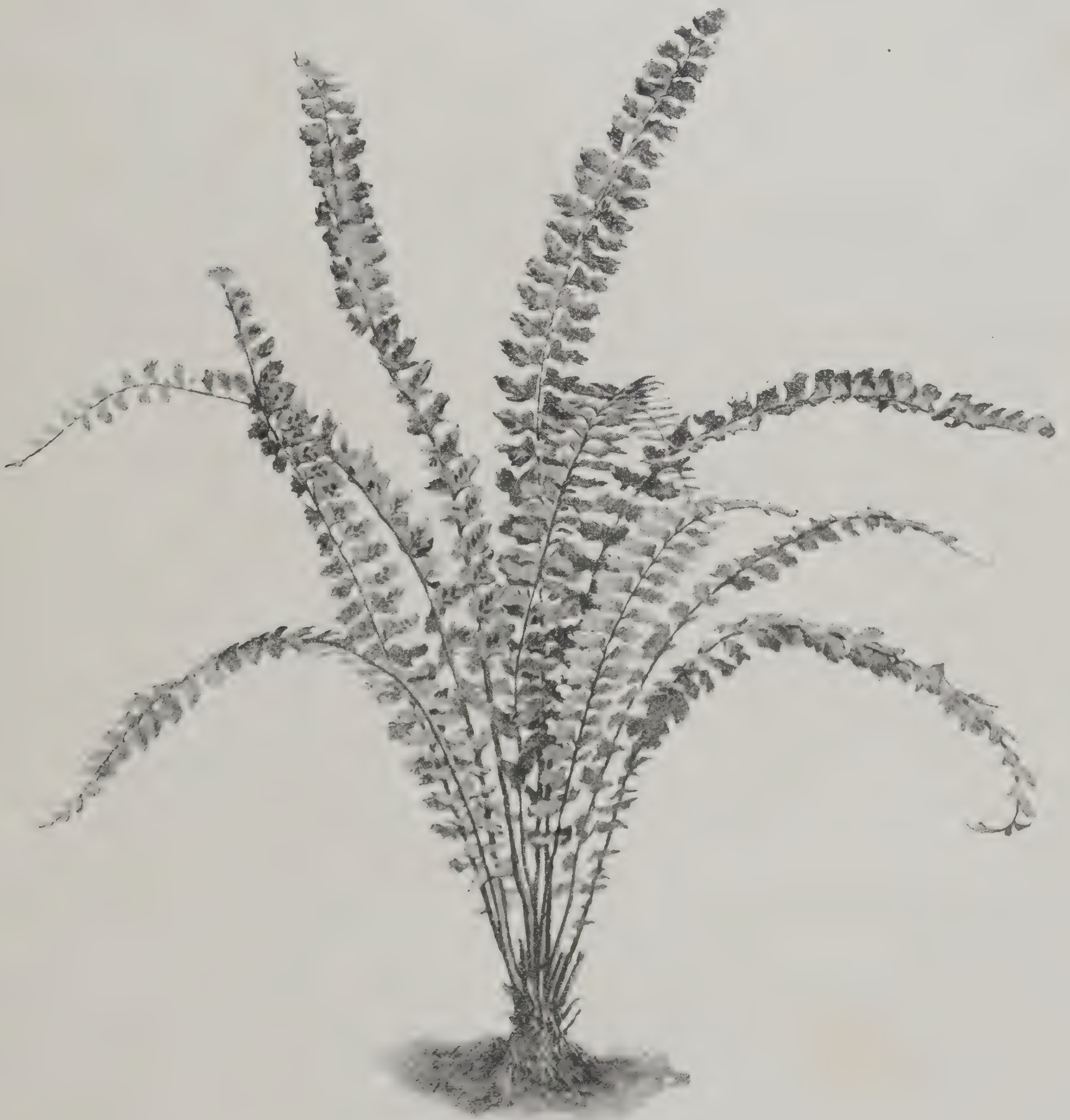


Fig. 110. *Asplenium incisum*
(½ nat. size).

A. (Euasplenium) incisum—Eu-as-ple′-ni-um; in-ci′-sum (incised), *Thunberg.*

This greenhouse species (Fig. 110), somewhat resembling the British *A. lanceolatum*, is a native of Japan, where it is common; also of Tsus-

Sima, Chusan, and Western China. Its fronds, 8in. to 12in. long and 1½in. to 2in. broad, are borne on tufted, polished stalks of a chestnut-brown colour and 2in. to 3in. long. The numerous leaflets, of a particularly thin, papery texture, are blunt in the lower part of the frond, whereas the central ones, 1in. long and spear-shaped, are cut down to the midrib into numerous egg-shaped pinnules (leafits) conspicuously truncated (appearing as if bitten off) at their base on the lower side and deeply pinnatifid. The linear-oblong sori (spore masses) are disposed one to each vein. This species is also known as *A. elegantulum.—Hooker*, *Species Filicum*, iii., p. 190. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

A. (Darea) irregulare—Da′-rĕ-a ; ir-reg-ul-a′-rĕ (irregular), *Baker*.

A stove species, of small dimensions, native of the Sierra del Crystal, Guinea Coast. Its fronds, of a sub-coriaceous (almost leathery) texture, 6in. to 8in. long and 2in. to 3in. wide, are borne on naked, firm, erect, pale green stalks 2in. to 4in. long. The numerous leaflets vary considerably in shape: while the upper ones are simple, about ½in. wide, and narrow-sickle-shaped, those next to it are dichotomously (repeatedly) forked, and the lowest, which are regularly pinnate, show a prolonged simple point and several distant pinnules (leafits) ¼in. to ½in. long. The sori (spore masses), which are covered with very narrow involucres, are sometimes ¼in. long.—*Hooker*, *Synopsis Filicum*, p. 222.

A. (Euasplenium) Jamesoni—Eu-as-ple′-nĭ-um ; Jame-so′-ni (Jameson's), *Hooker*.

This stove species, of medium dimensions, native of the Andes of Ecuador, is distinguishable at first sight by the firm, erect nature of its stalks, the lower part of which is densely clothed with large, brown scales. The fronds which they support, of a thin, papery texture, are 1ft. to 2ft. long, 9in. to 12in. broad, and furnished with numerous leaflets cut down to a broadly-winged stalk into pinnules (leafits) which are again deeply cleft, thus forming segments of a peculiar spathulate (spoon-shaped) form. The main stalk of the leafy portion is compressed and winged upwards. The large, oblong sori (spore masses) are disposed in two lines close to and nearly parallel with the midrib.—*Hooker*, *Species Filicum*, iii., p. 184, t. 205.

A. (Diplazium) japonicum—Dip-laz′-ĭ-um ; jap-on′-ic-um (Japanese), *Thunberg.*

A greenhouse species, of small dimensions, native of Japan, China, and the Himalayas ; distinct from most others through the creeping nature of the slender rhizome from which its fronds, 9in. to 15in. long and 4in. to 6in. broad, are produced. The peculiar straw-colour of the stipites (stalks) is also a distinguishing character of these fronds, which are furnished with eight to ten leaflets cut down in the lower part into close, oblong, slightly-toothed lobes of papery texture and bright green on both surfaces. The sori (spore masses) reach two-thirds of the way to the edge on both margins. This plant is in Hooker's "Species Filicum," iii., p. 251, described as *A. Schkuhrii*, under which name it is frequently met with in private collections.

A. javanicum—jav-an′-ic-um (from Java). Synonymous with *Allantodia Brunoniana.*

A. (Diplazium) Klotzschii—Dip-laz′-ĭ-um ; Klotzsch′-ĭ-i (Klotzsch's), *Mettenius.*

This stove species, of very large dimensions, is a native of Columbia and Venezuela. It is of an almost arborescent nature, and its ample fronds, 3ft. to 5ft. long and 9in. to 18in. broad, are borne on strong, upright stalks of a dark brown colour and scaly at their base ; they are furnished with leaflets 6in. to 9in. long, 3in. to 4in. broad, deep green, and of a papery texture. The leaflets are divided into leafits 2in. to 3in. long, which are subdivided into slightly-toothed lobes. The linear-oblong spore masses fall short of the edge of the lobes.—*Hooker, Species Filicum*, iii., p. 263.

A. (Euasplenium) Kraussii—Eu-as-ple′-nĭ-um ; Kraus′-sĭ-i (Krauss's), *Moore.*

A small-growing, greenhouse plant, native of Natal, and so closely related to *A. viride* as to look like a form of that species. The fronds, 3in. to 4in. long and ½in. broad, are furnished with about twelve pairs of sessile pinnæ (stalkless leaflets), which have their upper edge sharply toothed, while their lower one is smooth. The linear-oblong sori (spore masses) are disposed from one to three to each leaflet and occupy an oblique position.—*Hooker, Species Filicum*, iii., p. 147, t. 180A.

A. (Anisogonium) Kunzei—An-is-og-o′-nĭ-um ; Kunz′-ĕ-i (Kunze's), *Mettenius.*

A stove species, of small or medium dimensions, native of Ecuador and Peru. Its coriaceous (leathery) fronds, 9in. to 18in. long and 2in. to 6in. broad, are spathulate (spoon-shaped) and pinnate (divided to the midrib) only at their base, where they are distinctly lobed ; their upper part is deeply cleft into small, lanceolate (spear-shaped) lobes. The sori (spore masses) are disposed in slender lines extending from the midrib to the edge of the fronds.—*Hooker*, *Species Filicum*, iii., p. 266.

A. (Euasplenium) laciniatum—Eu-as-ple′-nĭ-um ; lac-in-ĭ-a′-tum (torn, fringed), *Don.*

This pretty, greenhouse species, native of Japan and the temperate regions of the Himalayas, somewhat resembles the better-known *A. planicaule.* Its fronds, however, are of a much thinner texture, larger, and more deeply divided ; they are borne on erect, firm stalks 4in. to 8in. long, of a greyish colour and often scaly, usually measure 1ft. to 1¼ft. in length and about 3in. in breadth, and are furnished with from twelve to twenty pairs of stalked, horizontal, sharply-pointed pinnæ (leaflets). The leaflets have their edge cut down nearly or quite to the midrib into small, stalked, egg-shaped lobes, which are also deeply toothed round their outer edge. The sori (spore masses) fall short of the edge.—*Hooker*, *Species Filicum*, iii., p. 164, t. 200A. *Beddome*, *Ferns of Southern India*, t. 145.

A. (Euasplenium) lætum — Eu-as-ple′-nĭ-um ; læ′-tum (cheering), *Swartz.*

A stove species, whose habitat extends from Mexico and Cuba southwards to the Amazon. Its fronds, 6in. to 12in. long and 3in. broad, are borne on stalks 4in. to 6in. long and of a brownish colour ; they are furnished on each side of the midrib with from sixteen to twenty-four sessile pinnæ (stalkless leaflets) of a thin, papery texture, sharply pointed and irregularly toothed at the edge ; the upper side of the pinnæ is suddenly narrowed at the base, while the lower one, partly cut away, forms a broad, truncate (broken-off curve. The sori (spore masses) are disposed in two unequal rows falling short of both edge and midrib.—*Hooker*, *Species Filicum*, iii., p. 133, t. 173.

A. (Euasplenium) lanceolatum—Eu-as-ple′-nĭ-um ; lan-cĕ-ol-a′-tum (spear-shaped), *Hudson.*

Though found wild in Algiers, Madeira, and the Azores, this pretty, hardy Fern, of small dimensions, is principally a native of South-Western Europe and is found as an indigenous plant in countries extending from England to Greece. The Spear-shaped Spleenwort, as it is commonly called, is an exceedingly interesting species ; its distribution is particularly local, and, although undoubtedly a British Fern, it is of a comparatively delicate habit, growing naturally only in peculiarly sheltered, well-drained, yet moist situations. It is in the second edition of Ray's "Synopsis Methodica Stirpium Britannicarum," published in 1696, that we find this interesting plant first given as a native of the British Islands, and it is there stated that Dr. Sherard had found it "on the rocks on the north side of the Isle of Jersey." Some thirty years later, in the third edition of the same work, its discovery in England was first noticed, "Mr. Bobart having found it in the north porch of the church at Adderbury, in Oxfordshire. Dr. Woodward also found it in England." In the crevices of rocks and old walls in the South and West of England, and especially about St. Ives, in Cornwall, it appears to grow freely. It has also been met with in Devonshire, Somerset, Sussex,

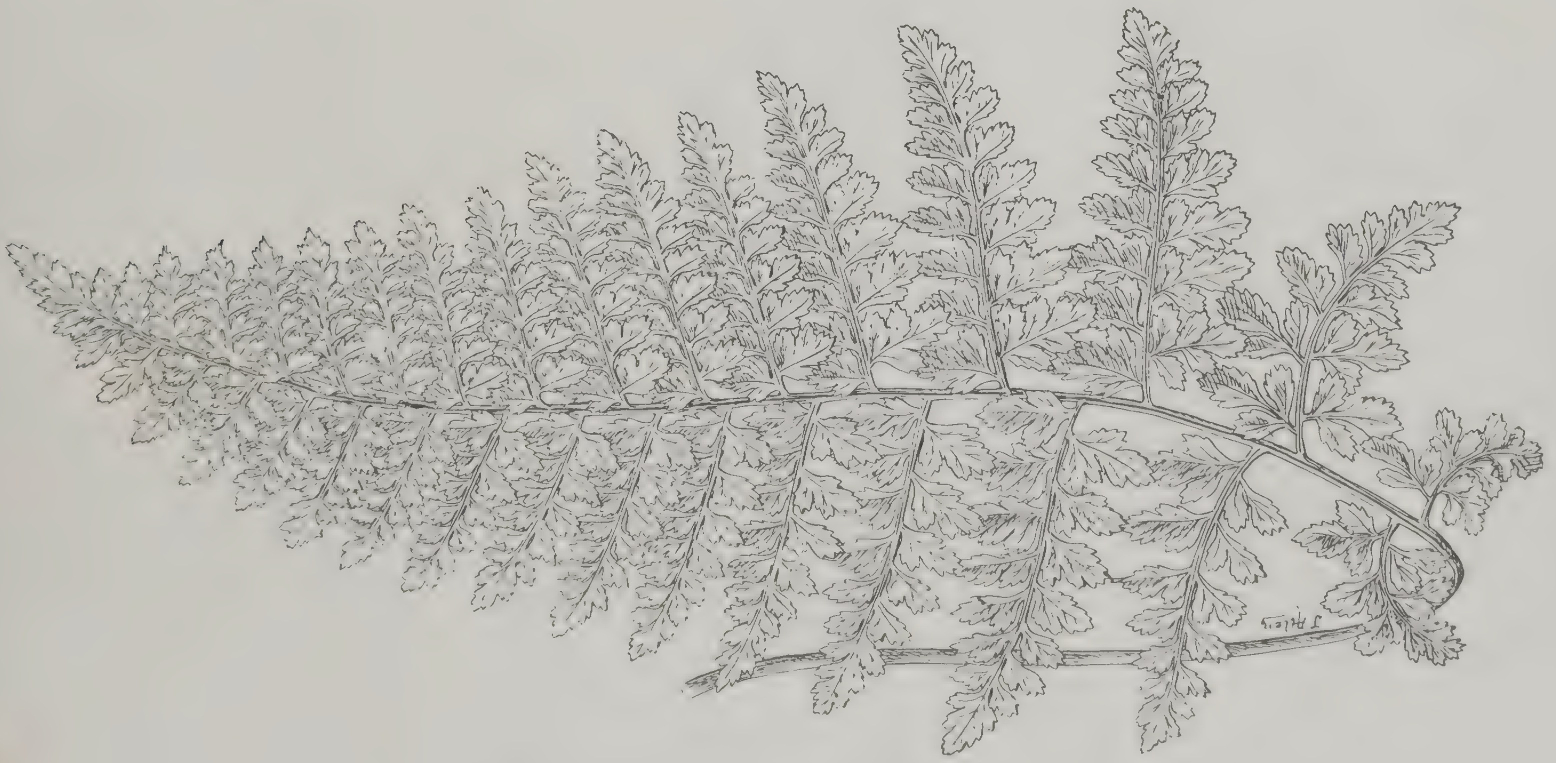


Fig. 111. Frond of Asplenium lanceolatum
(⅔ nat. size).

and Gloucestershire; in and around Tunbridge Wells; in Oldbury Court Woods and in the lanes in the neighbourhood of Stapleton, where, Mr. Sweet (in his "Bristol Flora") says, "the area of this plant is no more than half a mile, occurring on the Old Red Sandstone." It has also been found in Carnarvonshire, Denbighshire, Glamorganshire, Merionethshire, and Pembrokeshire, but always in comparatively small quantities.

The fronds of *A. lanceolatum*, 9in. long and 2in. to 4in. broad, are abundantly produced from a central crown and are borne on naked, glossy stalks 3in. to 4in. long and of a peculiar chestnut-brown colour; they are bipinnate (twice divided to the midrib) and spear-shaped in outline, and are furnished on each side of the midrib with numerous pinnæ (leaflets). The lower leaflets are distant and cut down to the midrib into numerous oblong pinnules (leafits), which are truncate at their lower side, sharply toothed and often broadly lobed below (Fig. 111). The fructification covers the whole of the under-surface of the fronds, for the oblong sori (spore masses) are so abundantly produced that when mature they become confluent in irregular masses.—*Hooker, Species Filicum*, iii., p. 190. *Nicholson, Dictionary of Gardening*, i., p. 131. *Lowe, Ferns British and Exotic*, v., t. 26.

Like most of its congeners of small dimensions, *A. lanceolatum* grows well in a greenhouse, shaded from the hot sun. Under such treatment, and provided it be kept moderately moist, the stature of this plant is much increased, and its fronds then attain a length of from 10in. to 12in. and are of a beautiful dark green. The soil which suits this species best is a mixture of peat, lime-rubbish, bricks broken small, and leaf mould, in about equal proportions. In planting or potting, the crown requires to be kept well above the surface of the soil. This species is usually propagated by division of the crowns in early spring, but the operation is a delicate one, requiring a little more attention than it is usual to bestow on British Ferns.

A. lanceolatum, whether in the wild state or under cultivation, has produced very few varieties worthy of record; the following are the most distinct:

A. l. bifidum—bif′-id-um (forked), *Lowe*.

A dwarf form, found in Devonshire. Its fronds, only about 4in. long, differ from those of the species in having their extremity divided in two instead of tapering to a point.—*Lowe, Our Native Ferns*, ii., p. 156, fig. 498.

A. l. crispatum—cris-pa′-tum (curled), *Moore.*

A very pretty and very distinct form, found in Guernsey. Its broadly-spear-shaped and distinctly bipinnate fronds, 4in. to 8in. long, differ from all others by their curly appearance; this is produced by the margins of the lobes of the pinnules (leafits) being curled under so as to have a crispy character, the thickened teeth thus becoming very conspicuous.—*Nicholson, Dictionary of Gardening*, i., p. 131. *Lowe, Our Native Ferns*, ii., p. 158.

A. l. excisum—ex-ci′-sum (bitten-off), *Lowe.*

In this dwarf form, originally found at Shawbridge, South Devon, the extremity of the fronds appears as if bitten off, and the pinnules in their upper half are variable in form and much contracted.—*Lowe, Our Native Ferns*, ii., p. 157, fig. 501.

A. l. incisum—in-ci′-sum (cut), *Lowe.*

This is a robust form, with fronds 1ft. or more in length, found in Jersey. The pinnæ (leaflets) are alternate (not opposite) and the pinnules (leafits), which are deeply cut and show conspicuous sharp-pointed teeth, are occasionally depauperated (impoverished) or even wanting.—*Lowe, Our Native Ferns*, ii., p. 157, fig. 500.

A. l. Kitsoniæ—Kit-so′-nĭ-æ (Kitson's), *Lowe.*

This large-growing, lax form, originally found in Devonshire, is probably the strongest one known, for its fronds usually measure about 14in. in length. The pinnæ (leaflets), everywhere lax, are very remote, the distance between the basal pair and the next one being 2½in.; the others are about ½in. apart throughout the fronds, which are widest in the centre, very gradually tapering towards the extremity. The pinnules (leafits), also lax, are toothed, the basal ones being larger and more divided, the others wedge-shaped at their base and flattened and toothed at their upper margins.—*Lowe, Our Native Ferns*, ii., p. 156, fig. 499.

A. l. microdon—mi′-crod-on (small-toothed), *Moore.*

This variety, which was originally found in Guernsey and subsequently near Penzance, is undoubtedly the most striking of all the known forms of the Spear-shaped Spleenwort; in fact, it is so distinct that when first discovered it was thought to be a variety of *A. marinum* and was described as such by T. Moore, owing to its being so little divided. The larger and more fully-developed fronds, however, have shown it to be an undivided form of *A. lanceolatum.* Its fronds, 9in. to 12in. long and about 1½in. broad, are simply pinnate (only once divided to the midrib); they are irregularly linear and terminate in a tapering point. The leaflets are very distinct, being shortly stalked and deeply lobed; the lowest ones are triangular, oblique, deflexed (thrown back), and taper to a blunt point; the upper ones are shorter, but are equally lobed and undulated at the margin, which is finely toothed. The basal lobes are rounded, divided nearly to the midrib, and overlapping, the divisions becoming shallower upwards. The small and oblong sori (spore masses) are situated near the margin.—*Lowe, Our Native Ferns,* ii., p. 154, t. 39B; also *New and Rare Ferns,* ii., t. 11B. *Nicholson, Dictionary of Gardening,* i., p. 131.

A. (Diplazium) lanceum—Dip-laz′-ĭ-um; lan′-cĕ-um (lance-shaped), *Thunberg.*

A greenhouse species, of small dimensions, native of the Himalayas, Ceylon, China, and Japan. The fronds are of a leathery nature, entire, 6in. to 9in. long, about ¾in. broad, and attenuated gradually upwards and downwards, the edge being entire or slightly undulated. The sori (spore masses) are narrow and long, reaching nearly to the edge but not to the midrib.—*Hooker, Species Filicum,* iii., p. 235. *Nicholson, Dictionary of Gardening,* i., p. 131. *Beddome, Ferns of Southern India,* t. 227.

A. (Euasplenium) laserpitiifolium—Eu-as-ple′-nĭ-um; la-ser-pi′-tĭ-if-ol′-ĭ-um (Laserpitium-leaved), *Lamarck.*

This very handsome and deservedly popular, greenhouse species, native of the Polynesian Islands and North Australia, is remarkable on account of the elegance of its much-divided fronds, which usually measure from 2ft. to 4ft. in length and 6in. to 18in. in breadth, and are borne on firm, erect, greyish stalks 6in. to 12in. long. The numerous leaflets are of a papery texture and vivid green colour; the lowest are from 6in. to 9in. long and 4in. to 6in. broad; and are cut down to the midrib into numerous distinct pinnules (leafits) which are again cut half-way or quite to the midrib (Fig. 112). The sori (spore masses) are short, linear-oblong, irregular, and disposed from two to four on each segment or pinnule.—*Hooker, Species Filicum*, iii., p. 171, t. 203. *Nicholson, Dictionary of Gardening*, i., p. 131. *Lowe, New and Rare Ferns*, t. 13. *Beddome, Ferns of Southern India*, t. 225.

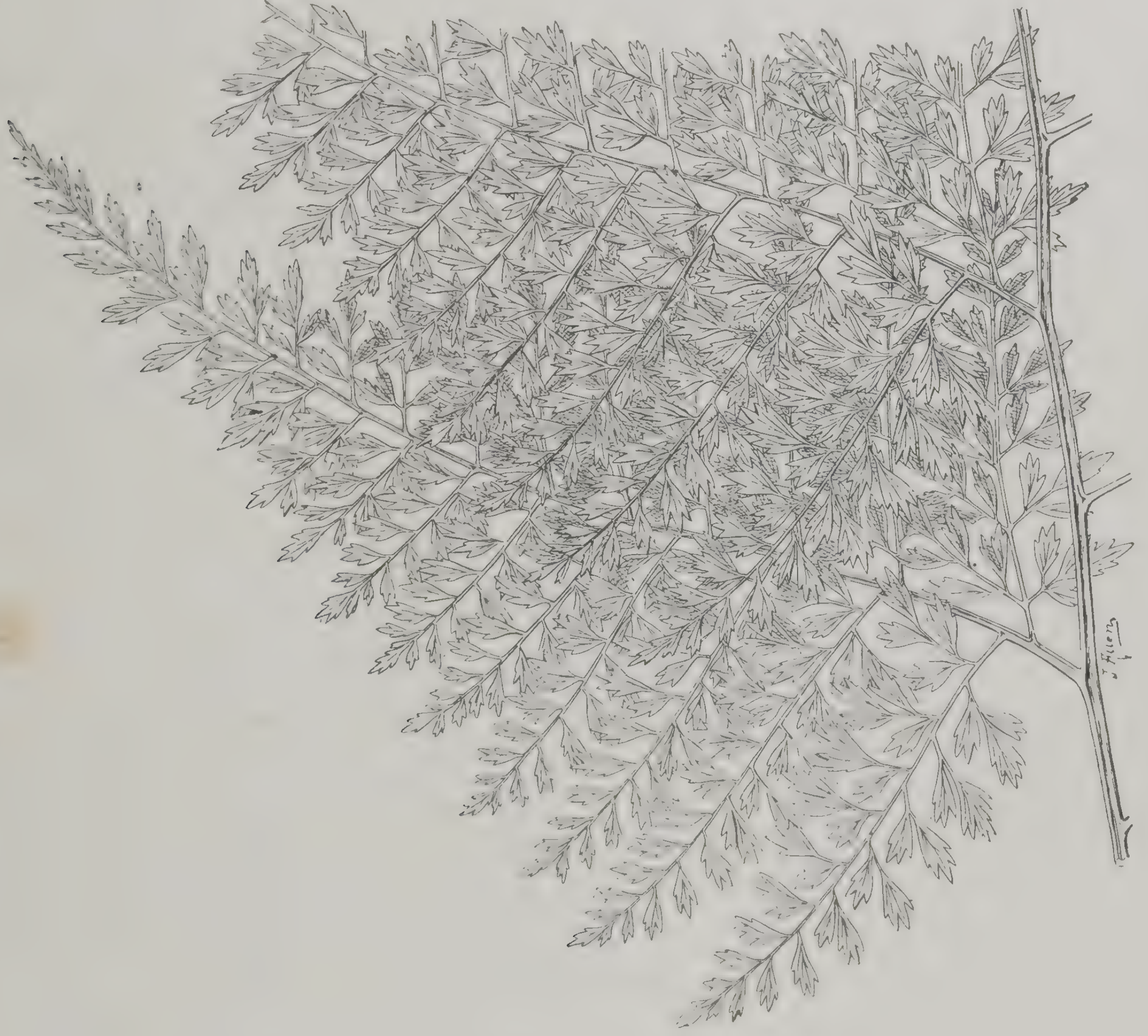


Fig. 112. Pinna and Portion of Pinna of Asplenium laserpitiifolium
($\frac{2}{3}$ nat. size).

A. (Diplazium) latifolium—Dip-laz′-ĭ-um; la-tif-ol′-ĭ-um (having broad leaves), *Don.*

A robust-growing, greenhouse species, of nearly arborescent habit, native of Ceylon, the Neilgherries, and South China. The fronds, 3ft. to 4ft. long and 1ft. to 1½ft. broad, are borne on strong, erect, smooth stalks 1ft. or more long, clothed towards the base with linear, crisped, dark brown scales; they are furnished on each side of the midrib with about twelve leaflets, the largest of which are fully 12in. in length by 4in. in breadth. The pinnules (leaflets), which are numerous and of a somewhat leathery texture, 2in. long and ½in. broad at the base, have their edge slightly toothed and the base truncate (terminating abruptly) on both sides. The sori (spore masses) are linear and about two lines long.—*Hooker*, *Species Filicum*, iii., p. 258.

A. laxum pumilum—lax′-um pu′-mil-um (loose and small).

Under this popular name, for which we can find no authority, one of the handsomest forms of the New Zealand *A. bulbiferum* is very extensively grown, being one of the Ferns best adapted for indoor decoration. The most distinctive character lies in the closeness of the crown, which is always well filled up with fronds falling outwardly, yet forming a most compact and symmetrical plant. It is of slender habit, dark green in colour, and the segments or sub-divisions of the frond are so narrow that the spore masses frequently appear as if marginal.—*Hooker*, *Synopsis Filicum*, p. 218.

A. (**Diplazium**) **Lechleri**—Dip-laz′-ĭ-um ; Lech-le′-ri (Lechler's), *Mettenius*.

This is a very strong-growing, stove species, of somewhat coarse habit, but well adapted for planting on the warm rockery. Its fronds, 3ft. long and 2ft. broad at the base, are borne on stout, upright stalks 2ft. to 3ft. long and scaly towards the base. The pinnæ (leaflets), of a very coriaceous (leathery) texture and about 1ft. long by 3in. broad, taper to a sharp point at their extremity, while their base is equally rounded on both sides and their edge is slightly toothed towards the point. The sori (spore masses) begin at the midrib but fall short of the edge.—*Hooker*, *Species Filicum*, iii., p. 244.

A. (**Euasplenium**) **Linckii**—Eu-as-ple′-nĭ-um ; Linck′-ĭ-i (Linck's), *Kuhn*.

A greenhouse species, of small dimensions, native of Mount Kilimanjaro, East Tropical Africa, where it is found at elevations varying between 5000ft. and 8000ft. Its fronds, seldom more than 8in. long, are borne on short, straw-coloured stalks and are quadripinnatifid (four times divided half-way to the midrib) ; their leaflets, of a somewhat leathery texture and ten or twelve on each side, are deltoid (in shape of the Greek delta, Δ), and have their wedge-shaped lobes shortly stalked and furnished with sharp, narrow, unequal teeth. The sori (spore masses) are only about two lines long.—*Hooker*, *Synopsis Filicum*, p. 487.

A. (Euasplenium) lineatum—Eu-as-ple′-nĭ-um ; li-nĕ-a′-tum (streaked), *Swartz.*

This singular, stove species, native of the Mauritius and Bourbon Islands, is a very puzzling plant on account of its gradually running into forms with leaflets again pinnate, which have either small, narrow-linear pinnules (leafits) such as in *Darea inæqualis* of Willdenow and *D. bifida* of Kaulfuss, or even these latter again deeply bifid (twice-cleft) or pinnatifid (cut half-way to the midrib) as in *D. bifida* and *D. violescens* of Bory. Its fronds, 1ft. to 2ft. in length, 4in. to 6in. in breadth, and borne on firm, erect stalks 6in. to 9in. long and more or less scaly, are, however, usually simply pinnate (once divided to the midrib) ; the twenty or thirty sessile pinnæ (stalkless leaflets) on each side of their midrib are of a thin texture, of a dark green colour, and toothed throughout. The sori (spore masses) are disposed in very regular rows reaching from the midrib nearly to the edge.—*Hooker, Species Filicum*, iii., p. 104. *Nicholson, Dictionary of Gardening*, i., p. 131.

A. (Anisogonium) lineolatum — An-is-og-o′-nĭ-um ; li-nĕ-ol-a′-tum (slightly streaked), *Mettenius.*

A stove species, native of the Philippines and the Malayan Peninsula and Islands. The fronds are occasionally simple (undivided), but are usually composed of a terminal leaflet and from three to six pairs of lateral ones 6in. to 12in. long and 2in. or more broad, equally entire, and of a leathery texture. The sori (spore masses) are disposed in slender lines extending from the midrib to the edge.—*Hooker, Species Filicum*, iii., p. 268. *Beddome, Ferns of British India*, t. 330.

A. (Euasplenium) longicauda—Eu-as-ple′-nĭ-um ; long-ic-au′-da (having a long tail), *Hooker.*

A very singular, stove species, from the Cameroon Mountains and Fernando Po, with fronds 1ft. to $1\frac{1}{2}$ft. long and 6in. to 9in. broad, borne on firm, erect, brownish stalks 6in. to 12in. long and nearly naked. The fronds are composed of a large, oblong, terminal leaflet 6in. to 8in. long and 1in. to $1\frac{1}{2}$in. broad, which is often elongated and proliferous, and of lateral leaflets similar in shape to the terminal one but usually smaller, with the margin slightly undulated. The texture is thin and papery and the colour deep green. The broad and distant sori (spore masses) do not reach either the edge or the midrib. In some fully-developed specimens the terminal leaflet is 1ft. long, considerably sinuated (wavy) upwards and proliferous (bud-bearing) at the extremity; the lateral leaflets are also often proliferous at the point.—*Hooker, Second Century of Ferns*, t. 69.

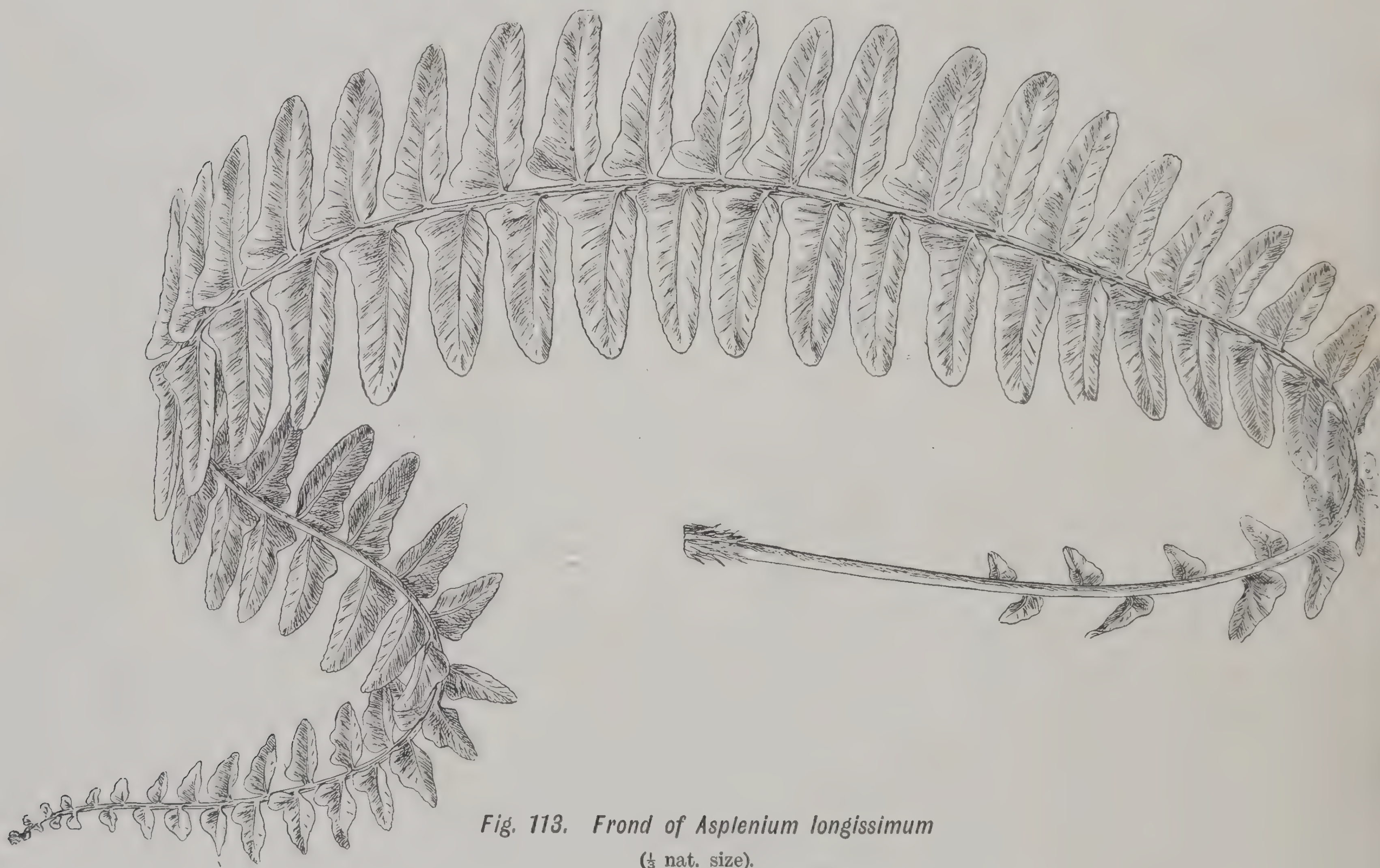


Fig. 113. Frond of Asplenium longissimum
(⅓ nat. size).

A. (Euasplenium) longissimum — Eu-as-ple′-nĭ-um; long-is′-sim-um (longest), *Blume.*

This beautiful, pendulous, stove species, native of Java, Borneo, Malacca, and the Mauritius, is, of all the known Aspleniums, the one best adapted for growing in a basket of large dimensions. Its very elegant fronds (Fig. 113), 2ft. to 3ft. long and 4in. to 6in. broad, are borne on strong, blackish stalks 3in. to 12in. long and very flexible; they are furnished on each side of the midrib with numerous pinnæ (leaflets) of a somewhat leathery texture and dark green in colour. The leaflets are stalkless and have their two sides nearly equal, with a distinct midrib, their edge slightly toothed, and their base often auricled (eared) on both sides. The fronds are abundantly produced from a thick and slightly-creeping rhizome (prostrate stem), so that, being an evergreen species, the plant is well furnished at all seasons with fronds which last a very long time. The numerous sori (spore masses) are disposed in two regular rows on each side of the midrib and reach nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 149, t. 190. *Nicholson*, *Dictionary of Gardening*, i., p. 131. *Beddome*, *Ferns of British India*, t. 63.

A. lucidum—lu′-cid-um (shining), *Forster.*

The plant which is extensively grown under this name for decoration is really a form of *A. obtusatum.* It is equally indigenous in Australia and in New Zealand.—*Hooker*, *Synopsis Filicum*, p. 207.

A. (Euasplenium) lunulatum — Eu-as-ple′-nĭ-um ; lu-nul-a′-tum (crescent-shaped), *Swartz.*

This pretty, stove species, also known as *A. erectum*, is very widely distributed throughout the Tropics, from Cuba to Rio Janeiro and Juan Fernandez, in the Sandwich Islands, Indian and Malayan Peninsulas, Ceylon, Cape Colony, northward to Bourbon, St. Helena, Ascension Islands, and on the Guinea Coast. It is of medium dimensions, and its narrow-spear-shaped fronds, 6in. to 18in. long and only about 1½in. broad, borne on nearly naked, grey stalks 2in. to 4in. long, are furnished with from twenty to twenty-five pairs of pinnæ (leaflets) about 1in. long, ¼in. broad, bluntish at the point, and more or less deeply notched throughout. These fronds are of a thin, papery texture, dark green in colour, and the lower pinnæ are often deflexed (thrown back), whereas the others are all horizontal. The sori (spore masses), disposed on each side of the midrib, form oblique lines falling short of both edge and midrib.—*Hooker*, *Species Filicum*, iii., p. 127. *Nicholson*, *Dictionary of Gardening*, i., p. 131.

Several pretty and distinct forms of *A. lunulatum* are cultivated as decorative Ferns, the principal ones being *A. l. Fernandesianum* of Kunze and *A. l. reclinatum* of Houlston (which is the same plant as *A. tenellum* of commerce and so named by Roxburgh). The former is distinguished from the typical plant by its more rigid habit and also by the more coriaceous (leathery) texture of its leaflets, while the latter is a form with wide-spreading fronds of equally dark green colour but copiously proliferous (bud-bearing) at their extremity.—*Hooker*, *Synopsis Filicum*, p. 202.

A. (Athyrium) macrocarpum—Ath-yr′-ĭ-um ; mac-roc-ar′-pum (large-fruited), *Blume*.

A greenhouse species, in general habit somewhat resembling our common *Nephrodium* (*Lastrea*) *spinulosum* and a native of Ceylon, North China, and the Himalayas, where it is found at an elevation of 6000ft. According to Beddome, it is also found on the Neilgherries and the Anamallays, and is abundant near Neddiwattan. Its fronds, 1ft. to 2ft. long and 6in. to 9in. broad, are borne on firm, upright, straw-coloured stalks 6in. to 9in. long and scaly below. The pinnæ (leaflets), of a thin, papery texture, 3in. to 5in. long and 1½in. broad, are spear-shaped and cut down to the midrib into numerous oblong pinnules (leafits) which are deeply notched and on the under-side of which the conspicuously large sori (spore masses) are abundantly disposed. The sori are covered by involucres so nearly reniform (kidney-shaped) and of such a transparent texture that Moore places this species under *Lastrea*.—*Hooker*, *Species Filicum*, iii., p. 222. *Nicholson*, *Dictionary of Gardening*, i., p. 132. *Beddome*, *Ferns of Southern India*, t. 152.

A. (Euasplenium) macrophyllum—Eu-as-ple′-nĭ-um ; mac-roph-yl′-lum (large-leaved), *Swartz*.

A greenhouse species, native of Polynesia, the Malayan Peninsula and Islands, Hong-Kong, and the Himalayas, and which, Beddome says, is also found on the Neilgherries and in the Anamallay forests growing on rocks and trees at various elevations between 2000ft. and 4000ft. Its ample fronds, 6in. to 18in. long and 6in. to 12in. broad, borne on stout, upright, brownish stalks of similar length, are furnished with from six to twelve pairs of stalked leaflets horizontally placed and opposite. These leaflets are of a somewhat leathery texture, 3in. to 6in. long, 1in. to 3in. broad, sharp-pointed, and have their edges sharply serrated (saw-toothed). The sori (spore masses) are disposed in close, long, parallel lines reaching from the midrib nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 158, t. 196. *Beddome*, *Ferns of Southern India*, t. 142.

A. (Euasplenium) magellanicum—Eu-as-ple′-nĭ-um ; mag-el-lan′-ic-um (from Magellan), *Kaulfuss.*

A greenhouse species, of small dimensions, much resembling our common Wall-Rue (*A. Ruta-muraria*), but with fronds more compound ; their second divisions or pinnules are again cut down into spathulate (spoon-shaped) segments slightly dented round the edges, and the sori (spore masses) are so copiously disposed as to entirely cover the under-surface of the pinnules. It is a native of Temperate South America.—*Hooker*, *Species Filicum*, iii., p. 177.

A. (Darea) Mannii—Da′-rĕ-a ; Man′-nĭ-i (Mann's), *Hooker.*

A greenhouse species, of very diminutive dimensions, seldom exceeding 2in. in height. It is a native of the Cameroon Mountains, Fernando Po, and Zambesi Land.—*Hooker, Second Century of Ferns*, t. 60.

A. (Hemidictyum) marginatum—He-mid-ic′-tў-um ; mar-gin-a′-tum (margined), *Linnæus.*

This stove species, one of the most gigantic of the whole genus, is a native of Tropical America, its habitat extending from Cuba and Venezuela to Peru and Brazil. Its robust fronds, 4ft. to 6ft. long and 2ft. to 4ft. broad, are borne on strong, erect, woody stalks 2ft. to 3ft. long and sometimes ½in. thick at the base, and are simply pinnate (only once divided to the midrib), their leaflets being disposed in several opposite pairs. The lowest of these leaflets are from 1ft. to 2ft. long and 3in. to 4in. broad, have their edge entire and their base often heart-shaped, and are of a thin, papery texture. The long and narrow sori are disposed on the free veins only.—*Hooker, Species Filicum*, iii., p. 271. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. (Euasplenium) marinum—Eu-as-ple′-nĭ-um ; mar-i′-num (Sea Spleenwort), *Linnæus.*

This greenhouse species, which, as its name implies, grows naturally by the seaside, is of a very cosmopolitan character, as besides being a native of the British Islands it is also indigenous in the South of France, Spain, the Canary Islands, Madeira, Teneriffe, the Azores, and the Northern parts of Africa, in all of which places it is tolerably abundant. It is, however, as a British plant that it is most interesting, and it is sad to have to record that in many localities where it formerly grew in abundance scarcely a plant of it is to be found now: all have been wantonly destroyed by the tourist and the Fern-hawker in their endeavours to distribute it among town

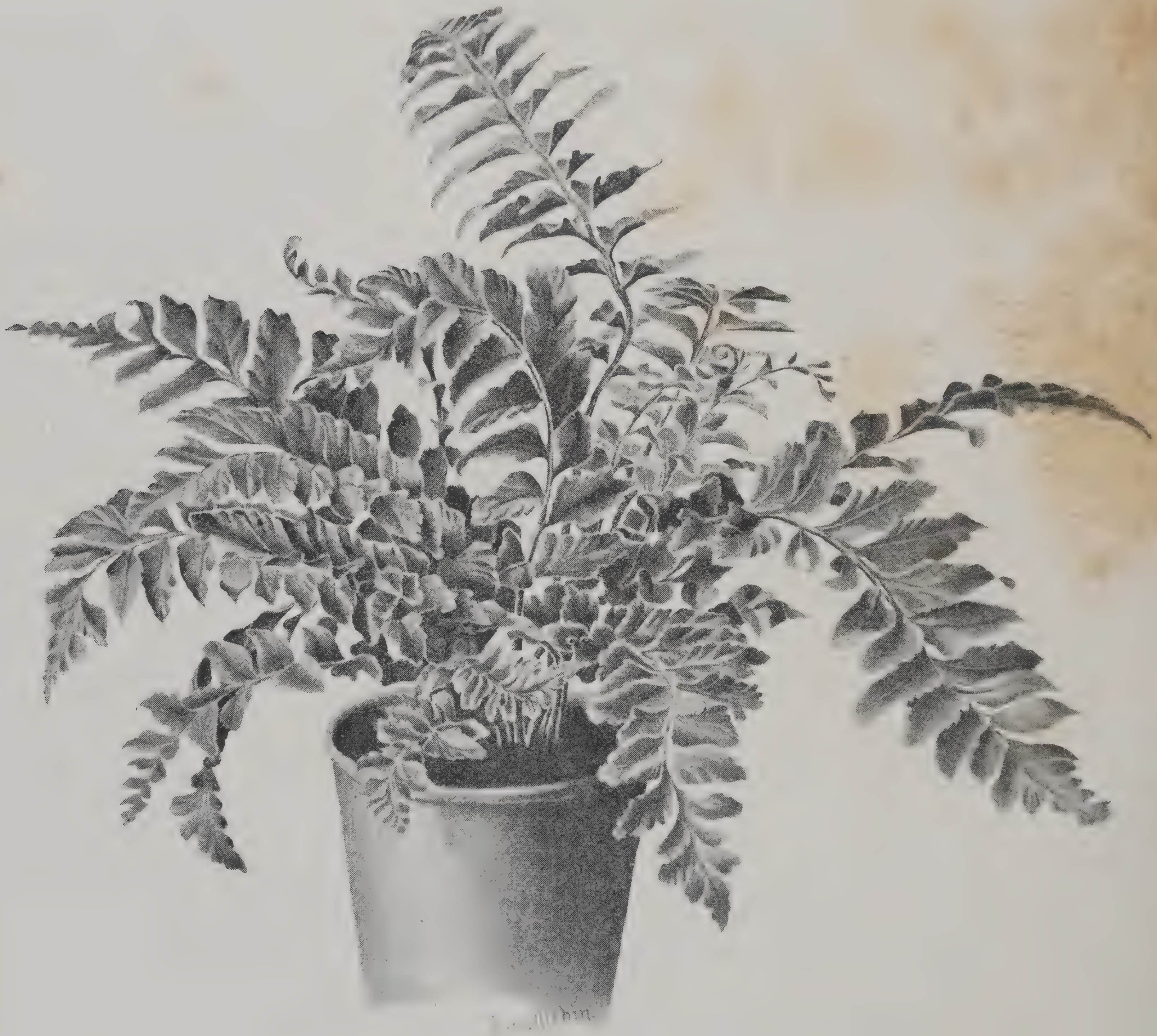


Fig. 114. Asplenium marinum
(⅓ nat. size).

gardens. The Sea Spleenwort generally grows in chinks of rocks, to the sides of which it clings so firmly that it is very difficult to remove the plants without injuring them. Fortunately it is a free-growing Fern which, even when detached with only a few roots, readily starts into growth under good treatment. Its firm, leathery foliage, of a pleasing dark green colour and most peculiarly glossy nature, renders it one of the most distinct of our native Ferns.

The Sea Spleenwort has for a very long time been known as a British plant, for Johnson, Gerarde's editor, in 1633 wrote: "It grows in the chinks of the rocks by the seaside in Cornwall;" whereas Gerarde himself, as far back as 1597, stated that "it groweth under shadowy rocks and craggy mountains in most places," which remark is rather too general for useful information. Ray found it "on the rocks about Prestholm Island, near Beaumaris, and at Llandwyn, in the Isle of Anglesey; about the Castle of Hastings, in Sussex, and elsewhere on the rocks of the Southern Coast." It has also been found on Marsden Rocks, Durham; in the Isle of Man and the Isle of Staffa, in Berwickshire, Aberdeenshire, Fifeshire, and on the Eastern Coast of Scotland. In Ireland it has been gathered on the Sutton side of Howth Mountain, at Underwood Killiney Hill, and in other places near Derrinane, in Kerry, and frequently on the Western and Southern Coasts; also in the Isle of Orkney, the Channel Islands, and up the Bristol Channel as far as Clevedon.

The fronds of the Sea Spleenwort, which in favourable situations and under generous cultivation sometimes attain 20in. in length, are produced from a single succulent crown almost entirely covered with black, chaffy scales, which, however, do not extend along the stalk; they usually are oblong-spear-shaped, from 6in. to 12in. long and 2in. to 3in. broad, and are borne on tufted, polished stalks 3in. to 6in. long and of a chestnut-brown or nearly black colour. The abundant leaflets are of a leathery texture and bright shining green in colour; those of the lower half of the frond are quite distinct (Fig. 114), spreading horizontally, 1in. or more long, ½in. broad, with their point sometimes sharp but more usually blunt and their margin notched and toothed, slightly truncate (terminating abruptly) below and often auricled (eared) above. The broad sori (spore masses) fall short of the edge. —*Hooker, Species Filicum*, iii., p. 95. *Nicholson, Dictionary of Gardening*, i., p. 132. *Lowe, Ferns British and Exotic*, v., t. 23.

Although really a British Fern, the Sea Spleenwort does not succeed well in the open in many parts of Great Britain; whereas it certainly luxuriates in warmth and readily adapts itself to the treatment allowed even to our stove plants, though it grows very well and forms splendid specimens in the cool and intermediate houses, pits, vineries, &c. *A. marinum* proves one of the handsomest Ferns in cultivation when planted in the temperate Fernery, where its shining and durable fronds, of a particularly leathery texture, show to great advantage, and are rendered still more striking by the purplish-black colour of their stalks, which, on account of their robust nature, entirely differ from all others of our native Ferns. Although in its natural state the Sea Spleenwort appears to require very little nourishment for its maintenance, and although when cultivated its young seedlings will often make their appearance and, if left undisturbed, grow luxuriantly in places where scarcely a particle of soil is to be found, yet it is more satisfactory to plant it in a compost of three parts fibrous peat and one of sand, with thorough drainage.

The various situations in which this species is found in its wild state naturally account for the slight variations in the general appearance of some of the specimens. Some very distinct varieties, mostly, if not all, of natural production, are in cultivation; the following are the most distinct and at the same time those which remain most constant:

A. m. coronans—cor-o′-nans (crowned), *Moore.*

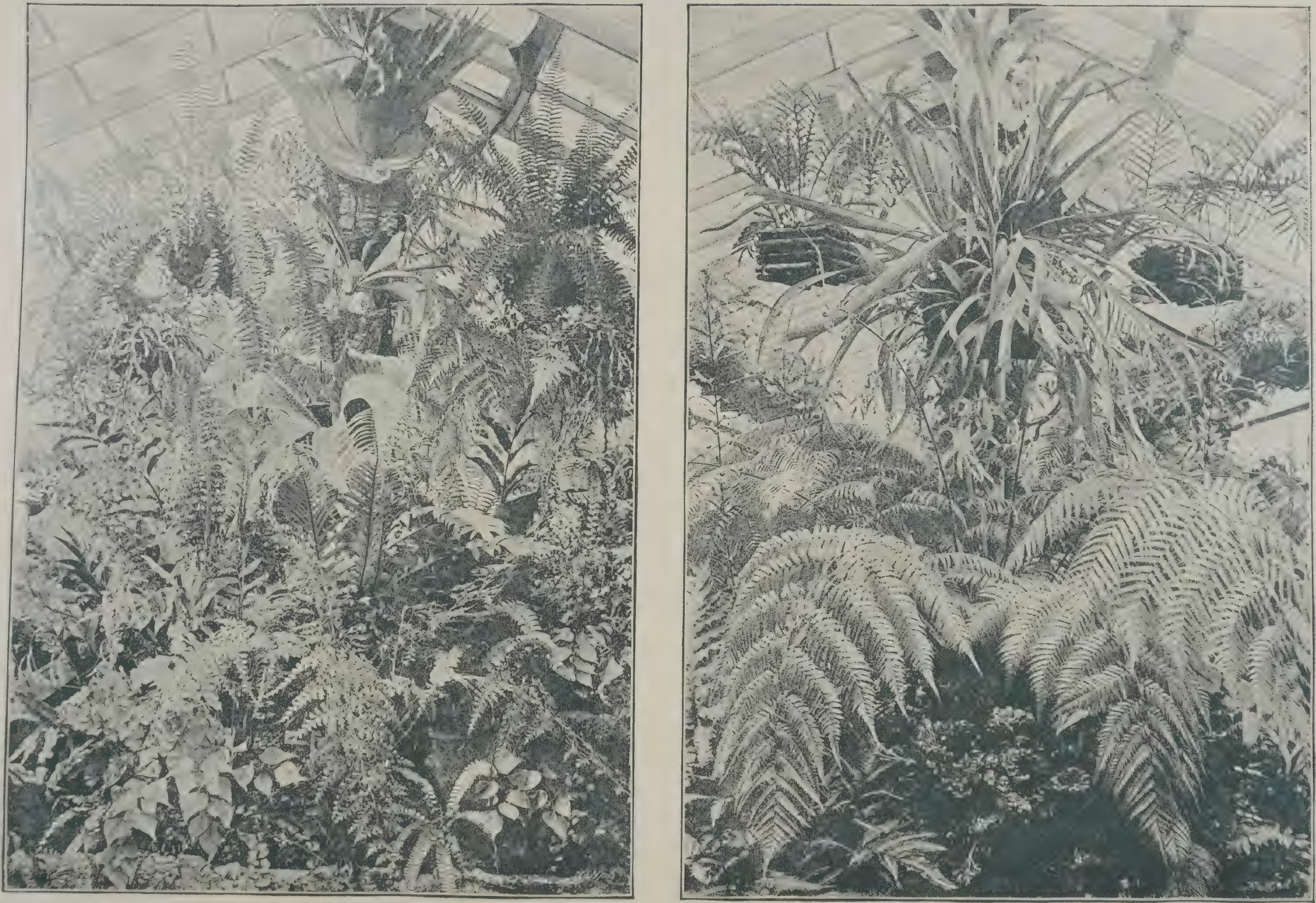
This is a very pretty, dwarf form, with fronds seldom more than 6in. long and simply pinnate. For about two-thirds of the way the leaflets, irregularly lobed and cut, are variable in form; the upper third is freely branched, with numerous overlapping, curled, and slightly-crested divisions, forming a dense head 2in. or more in diameter.—*Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. crenatum—cre-na′-tum (notched), *Moore.*

A pretty variety, with fronds 6in. to 8in. long, broadly spear-shaped, and furnished with blunt leaflets that are nearly trapeziform and deeply notched on their margins.—*Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. imbricatum—im-bric-a′-tum (imbricated or overlapping), *Lowe.*

This very distinct, dwarf form was raised from spores in the neighbourhood of Birmingham. Its fronds, seldom more than 6in. long, are distinct



Views of a Fern-House in Mr. H. B. May's Nursery, Upper Edmonton.

from those of all other known kinds through the disposition of their leaflets. These are placed so close to each other that they overlap fully one-half of their width and are consequently much imbricated; they are auricled (eared) at the base and minutely dented on their margins. The frond is of equal breadth nearly to the summit, where it rapidly contracts into a blunt, lobed leaflet (Fig. 115).—*Lowe, Our Native Ferns*, ii., p. 194, fig. 543.

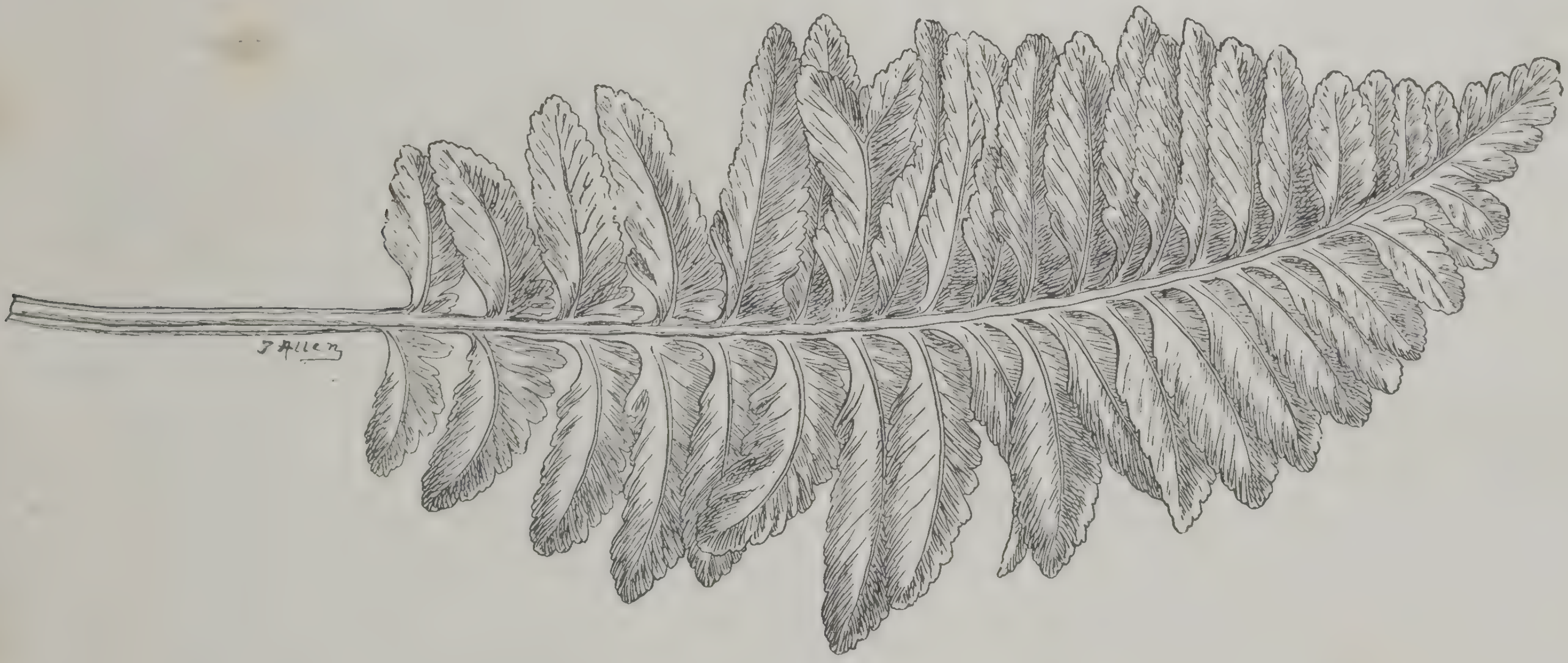


Fig. 115. Frond of Asplenium marinum imbricatum
(⅔ nat. size).

A. m. incisum—in-ci′-sum (cut), *Moore.*

A small, pretty form, found wild at Great Orme's Head and near Llangollen. Its fronds, 6in. to 9in. long, are furnished with leaflets only ½in. long, having their anterior base auricled (eared) and usually showing three deep incisions along the anterior margin. The few sori (spore masses) are large and are mostly situated at the anterior edge of the lobes.—*Lowe, Our Native Ferns*, ii., p. 189, fig. 533.

A. m. interruptum—in-ter-rup′-tum (interrupted), *Moore.*

A form that is more curious than beautiful, for it differs from the typical species only by its interrupted and irregular character, the pinnæ (leaflets) being variable in size and shape; some of them are long and triangular, others egg-shaped, one pinna being frequently four times as long as the next. —*Lowe, Our Native Ferns*, ii., p. 193, t. 45A.

A. m. laxum—lax′-um (loose), *Lowe.*

This is a very singular form, found wild in the Burrow, County Clare. Its fronds, 2ft. to 3ft. long and borne on long, ebeneous (blackish) stalks, are furnished with pinnæ (leaflets) set far apart, especially in the lower portion of the frond, where they are over 1in. distant and are also the smallest, gradually becoming larger to about 5in. below the summit and then slightly narrowing. The leaflets are simple, with a shallow-dented margin.—*Lowe*, *Our Native Ferns*, ii., p. 192, figs. 538 and 539.

A. m. mirabile—mi-ra′-bil-ĕ (wonderful), *Moore.*

In this very strange variety, the fronds, which are about 8in. long including the stalks, have their midrib cleft about half-way down from the top into two nearly equal divisions, which are again freely forked and furnished with bluntly-lobed leaflets and segments. The whole of the leafy portion is expanded, but not crested, into a breadth equal to the length of the frond, and the lower leaflets, more or less abnormal, are also bluntly lobed.—*Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. m. multifido-irregulare—mul-tif′-id-o–ir-reg-ul-a′-rĕ (irregular and much-cleft), *Lowe.*

A variety having fronds of medium size, with leaflets very irregular in size and form, some of them no larger than the lobes of others which are deeply divided, while others are simply toothed. The extremity of each frond is regularly forked.—*Lowe*, *Our Native Ferns*, ii., p. 197, fig. 547.

A. m. parallelum—par-al-le′-lum (parallel), *Moore.*

This is a very strong-growing variety, originally found in Guernsey, and the fronds of which attain 3ft. in length. The distinctive character resides in the shape of its leaflets, which are somewhat distantly placed, measure from 2in. to 2½in. in length and barely ½in. in breadth, and are parallel-sided, with their base wedge-shaped and their margin coarsely though not deeply toothed.—*Lowe*, *Our Native Ferns*, ii., p. 188, fig. 531.

A. m. plumosum—plu-mo′-sum (feathery), *Moore.*

Perhaps the handsomest form of *A. marinum*, for its fronds, which have a very elegant appearance and are from 6in. to 15in. long, are broadly spear-shaped and bi- or tripinnatifid (twice or three times divided half-way to the midrib). The leaflets, which are so closely set as to occasionally overlap one another, are cut nearly to the midrib into oblong divisions which are again more or less deeply cut and lobed.—*Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. ramo-plumosum—ra′-mo–plu-mo′-sum (branched and feathery), *Moore.*

A very handsome variety, with fronds divided nearly to the top of the stalks into two main branches which are distinctly pinnate (once divided to the midrib) and furnished below with distantly-set leaflets, whereas those of the upper part are imbricated (overlapping) and cut nearly to the midrib into egg-shaped or oblong lobes, the margins of which are slightly dentate (toothed).—*Nicholson, Dictionary of Gardening*, i., p. 132.

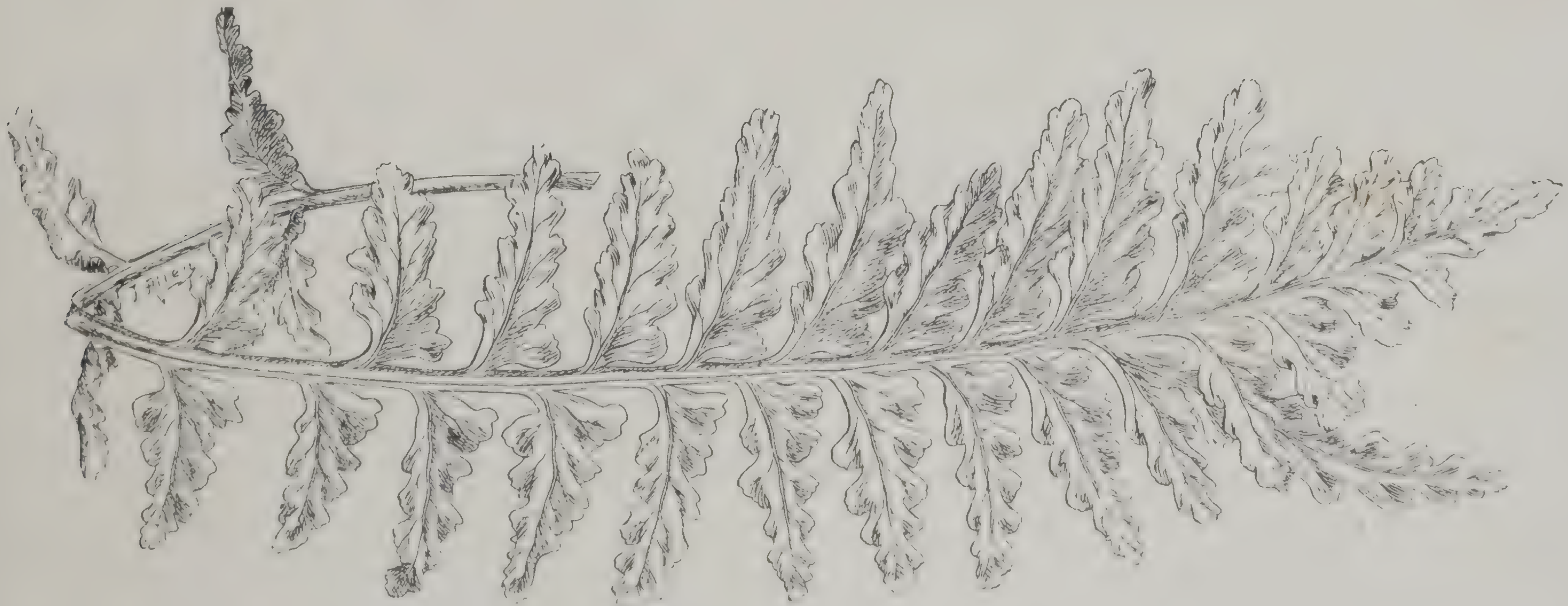


Fig. 116. Frond of Asplenium marinum ramosum
(nat. size).

A. m. ramosum—ra-mo′-sum (branched), *Wollaston.*

This pretty, dwarf, and very distinct form, originally found in Dorsetshire, is conspicuous by the branching of its fronds, 4in. to 8in. long, and also by the broad, short leaflets with which they are furnished. The basal leaflets are triangular and nearly as broad as they are long, wedge-shaped at the base, and remarkable for their irregular undulate and broadly-toothed margins. The plant is very free-growing, and produces abundantly its fronds, which are singularly and very irregularly divided, some being forked from about the middle of their leafy portion, while a few are borne on stalks divided near the base, but by far the greatest portion of them are more or less branched near their summit only, as illustrated in Fig. 116.—*Lowe, Our Native Ferns*, ii., t. 45B. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. ramo-trapeziforme—ra′-mo-trap-e-zif-or′-mĕ (branched and rhomb-shaped), *Clapham.*

In this pretty, dwarf, much-divided variety, originally found at Burniston, near Scarborough, the fronds, which are furnished with small, roundish-trapeziform, and usually sharply-toothed leaflets, branch at the top of the stalks or half-way up the leafy portion of the fronds, and these branches are again forked once or twice.—*Lowe, Our Native Ferns*, ii., 195, fig. 544.

A. m. subbipinnatum—sub′-bip-in-na′-tum (twice divided nearly to the midrib), *Moore.*

This very pretty variety, which was originally found in a cave at Petit Bot Bay, Guernsey, and later on in Cornwall, is equal in size to the typical species, but its fronds, 7in. long and 2½in. broad, are so much divided and so deeply lobed as to become quite bipinnate; the leaflets are wedge-shaped at the base, and slightly toothed on the margin. Lowe gives it as his opinion that this variety is never fertile.—*Lowe, Our Native Ferns*, ii., p. 188, fig. 532. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. Thompsoniæ—Thomp-so′-nĭ-æ (Mrs. Thompson's), *Lowe.*

An exceedingly distinct and very beautiful form, originally found wild in Devonshire, and having fronds 14in. long, widest at their base, and very gradually narrowing to the point. The leaflets are alternate (not opposite), narrow and long, and conspicuously auricled (eared), the basal ones especially so; their superior margin is notched and toothed, yet not deeply divided; the lower margin, on the contrary, is very deeply cut into narrow segments, some of the basal ones being even shortly stalked, and as these segments are disposed more or less at right angles with the midrib, the plant has a much laciniated (torn) appearance.—*Lowe, Our Native Ferns*, ii., p. 196, figs. 545 and 546. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. m. trapeziforme—trap-e-zif-or′-mĕ (rhomb-shaped), *Clapham.*

A rather dwarf variety, of robust habit, found in several localities, originally at Cloughton Bay, near Scarborough; later on at Salcombe, near Kingsbridge, Devonshire, and at Torquay; at St. Just, Cornwall, and in County Down. Its fronds, of very leathery texture and deep green in colour, are furnished with short leaflets that are rounded but hardly eared, the lower ones being deflexed (thrown back), trapeziform, the others often overlapping. —*Lowe, Our Native Ferns*, ii., p. 193, figs. 540 and 541.

A. m. variabile—var-ĭ-a′-bil-ĕ (variable), *Monkman.*

This very singular form, originally found amongst a batch of seedlings in the neighbourhood of Scarborough, and later on high up among the rocks above the caves of Kynance Cove, near the Lizard, on the Cornish coast, is of erect habit and dwarf dimensions. Its fronds, which are all more or less different in form and seldom more than 6in. long, are very dark shining-green; they have about one-third of their length ramose, sometimes branching several times, and are usually furnished with irregularly-shortened leaflets, though these are sometimes totally wanting.—*Lowe, Our Native Ferns*, ii., p. 191, fig. 537.

A. Martensianum—Mar-ten-sĭ-a′-num (Martens'). A form of *A. bulbiferum.*

A. (**Diplazium**) **maximum**—Dip-laz′-ĭ-um; max′-im-um (largest), *Don.*

This gigantic-growing, stove species, native of North India, is remarkable for its ample fronds, several feet long, 2ft. to 3ft. broad, and borne on firm, erect stalks 2ft. long or more and scaly only at the base. The numerous leaflets are from 9in. to 18in. long, 4in. to 8in. broad, divided into numerous distinct, sub-sessile (nearly stalkless) pinnules 2in. to 4in. long, of a soft, papery texture, with their edge more or less lobed. The sori (spore masses), disposed close to the midvein, are about two lines long.—*Hooker, Synopsis Filicum*, p. 239. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. (**Diplazium**) **melanocaulon**—Dip-laz′-ĭ-um; mel-an-oc-au′-lon (black-stalked), *Baker.*

A stove species, from Fiji and Aneitum, somewhat resembling in its mode of growth *A. arborescens*, from which it differs by the more leathery texture of its ample fronds, by their black stalks, and by the shorter spore masses.—*Hooker, Synopsis Filicum*, p. 240. *Nicholson, Dictionary of Gardening*, i., p. 132.

A. (Athyrium) Michauxii—Ath-yr′-ĭ-um; Mich-aux′-ĭ-i (Michaux's), *Sprengel.*

This very handsome, hardy species is a native of North America. Its fronds, which are deciduous (die down in the winter), are from 1ft. to 2ft. long, 3in. to 9in. broad, and borne on stalks 4in. to 8in. long and of a light claret-colour; they are of erect habit and twice or three times pinnate. The leaflets, of a thin, papery texture and deep green colour, are spear-shaped and divided into oblong, sharply-pointed leafits that are again cleft into deeply-toothed segments. The abundant sori (spore masses) are sub-lunate (half-moon-shaped) and their indusium (covering) is fringed on the free margin.—*Nicholson, Dictionary of Gardening*, i., p. 132. *Lowe, Ferns British and Exotic*, v., t. 37.

A. (Euasplenium) monanthemum—Eu-as-ple′-nĭ-um; mon-anth′-em-um (one-flowered), *Linnæus.*

This exceedingly pretty, greenhouse species is a native of the temperate regions of both hemispheres, being found abundantly in Madeira, the Azores, Cape Colony, and also along the Andes of Chili. Its simply-pinnate fronds, 1ft. to 1½ft. long and barely 1in. broad, borne on polished, chestnut-brown stalks seldom more than 2in. long, are of erect habit and furnished with twenty to thirty pairs of stalkless leaflets of a leathery texture, of a brilliant green colour, and disposed horizontally. These leaflets, about ½in. long and ¼in. deep, are of a peculiar dimidiate form, being fully developed on one side of the midvein and scarcely at all on the other; they are rounded at their extremity (which, like their upper side, is notched), suddenly narrowed at the base, and often eared; their lower side is more or less cut away in a straight or, in the lower ones, decurved line, and they are so closely placed as to be in some cases almost overlapping. Instead of being proliferous at their extremity or on their upper surface, the fronds of this species possess the peculiarity of producing little bulbils at the axils of the basal pair of leaflets only (Fig. 117), being in that respect different from most other Aspleniums in cultivation. The narrow-oblong and very conspicuous sori (spore masses) are mostly solitary, being disposed parallel with the lower edge of the leaflet; occasionally, however, there are two or even more to a pinna.—*Hooker, Species Filicum*, iii., p. 140. *Nicholson, Dictionary of Gardening*, i., p. 132. *Lowe, Ferns British and Exotic*, v., t. 1A.

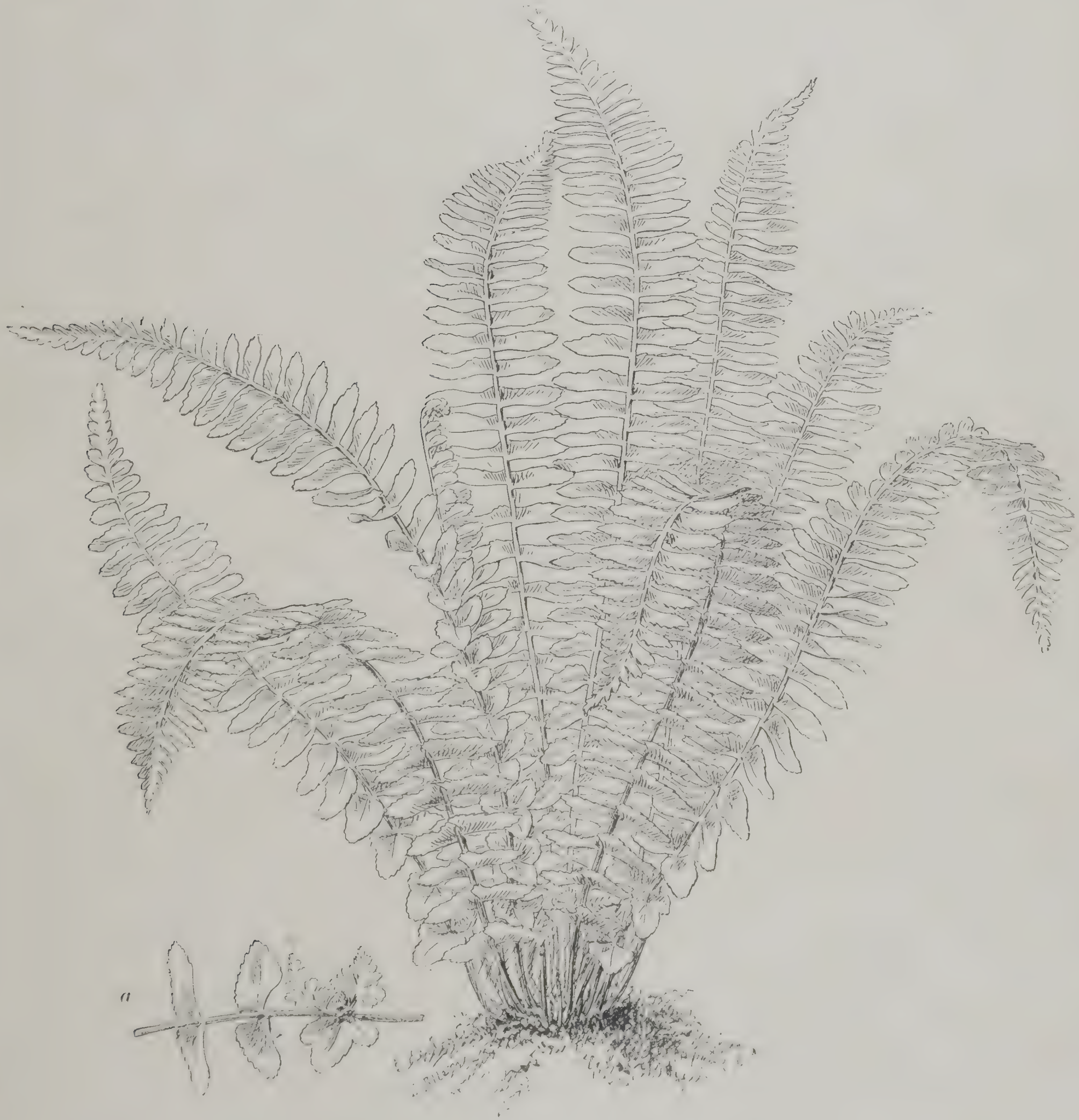


Fig. 117. Asplenium monanthemum—a, Portion of Frond showing the mode of Proliferation usually found on the Basal Pair of Leaflets in Fully-developed Specimens

(Plant, ⅓ nat. size; Leaflets with Bulbil, ½ nat. size).

A. (**Euasplenium**) **montanum**—Eu-as-ple′-nĭ-um ; mon-ta′-num (found on mountains), *Willdenow.*

This pretty, small-growing, greenhouse species is a native of North America, where it is called the Mountain Spleenwort, and, according to Eaton, is found in crevices of rocks in mountainous districts from Ulster County, New York, southward along the Alleghanies, and west of them to Kentucky, Tennessee, and Alabama. In these places it grows in dense tufts, the rootstocks being so matted and fastened together by interlacing that a single plant is not easily separated from the mass. The fronds, only 2in. to 3in. long and decidedly triangular-ovate in shape, are borne on wiry, naked stalks of similar length, polished and of a dark brown colour in their lower part, but becoming green and herbaceous below the base of the leafy portion of the fronds. The leaflets are of a leathery texture, gradually smaller and simpler towards the extremity of the frond, the lowest ones being distinctly stalked and divided to the midrib into spoon-shaped segments sharply toothed round the outer edge. The rather short and copious sori (spore masses) are placed near the midveins of the segments. This little Fern bears a certain resemblance to the small varieties of the European *A. Adiantum-nigrum;* while very small forms of it, or plants growing in very exposed situations, are somewhat like *A. Ruta-muraria*, and the authors of the "Synopsis Filicum" remark that it is intermediate between the two.—*Hooker*, *Species Filicum*, iii., p. 177. *Eaton*, *Ferns of North America*, ii., t. 51. *Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. (**Euasplenium**) **mucronatum**—Eu-as-ple′-nĭ-um ; mu-cro-na′-tum (sharp-pointed), *Presl.*

This is a delicate and well-marked, stove species, native of Brazil. Its fronds are 1ft. or more long, barely 1in. broad, and borne on slender, naked, polished stipites (stalks) 1in. to 2in. long ; they are very flaccid in habit and are furnished with numerous pairs of pinnæ (leaflets) of parchment-like texture and bright green in colour. The leaflets, which are 1½in. long and ¼in. broad, are stalkless, deflexed (thrown back), and deeply cut on both sides of the midrib into mucronate (sharp-pointed) lobes the base of which is heart-shaped on both sides. The sori (spore masses) are narrow-oblong and short.—*Hooker*, *Species Filicum*, iii., p. 128.

A. (**Darea**) **multifidum**—Da′-rĕ-a ; mul-tif′-id-um (much-cleft), *Brackenridge.*

A strong-growing, stove species, native of Tahiti and the Fiji and Society Islands. Its ample fronds, 2ft. to 3ft. long and 1ft. to 1½ft. broad, are borne on stout, erect, grey, naked stalks 1ft. to 1½ft. long, slightly scaly at their base only. The fronds, although remarkably large, have a very light appearance owing to their being quadripinnatifid (four times divided nearly to the midrib) ; they are of a leathery texture and are cut into spear-shaped pinnules (leafits) which in their turn are subdivided into segments ; the lowest segments are again cut down nearly to the stalk into close, spoon-shaped, bluntly-toothed divisions, upon the margins of which the very small sori (spore masses) are disposed, only one to each division.—*Hooker*, *Species Filicum*, iii p. 212.

A. multisectum — mul-tis-ec′-tum (much-cut). This is identical with *A. aspidioides.*

A. musæfolium—mu-sæ-fol′-ĭ-um (Musa-leaved). A variety of *A. Nidus.*

A. (**Euasplenium**) **myriophyllum**—Eu-as-ple′-nĭ-um ; my-rĭ-oph-yl′-lum (myriad-leaved), *Presl.*

This remarkably elegant and pretty Fern, native of North America, where it is popularly known as the Milfoil Spleenwort, is, by Hooker and Baker, classified as a variety of *A. rhizophyllum* of Kunze. Eaton, however, in his splendid work "Ferns of North America," retains it as a species, saying that "it is the most delicate and finely-divided of all our Aspleniums, and need not be confounded with any other native species." In general appearance it is much more like the popular *A. cicutarium*, also from Florida, than *A. rhizophyllum*, the proliferous and distinctive character of this latter species not being reproduced in *A. myriophyllum.* According to Eaton, it is found wild on the walls of a limestone cave at Schurlock's Spring, Jackson County, Florida, and near Ocala, also in Florida, where it grows in tufts at the bottom of pocket-like holes in cavernous lime-rocks, its fronds spreading flat around the orifice. The fronds, 1ft. to 1½ft. long, are borne on slender, dark brown stalks 1in. to 3in. long ; they are produced from a very short, upright rootstock and are tripinnate (three times divided to the midrib), the central pinnæ (leaflets), 1½in. long, having their lower pinnules (leaflts) cut down into several simple or forked, linear segments. The somewhat elongated sori (spore masses) are disposed one on the vein of each lobe or segment.—*Hooker*, *Synopsis Filicum*, p. 220. *Eaton*, *Ferns of North America*, ii., t. 51.

A. (Thamnopteris) Nidus—Tham-nop′-ter-is; Ni′-dus (nest), *Linnæus.*

This singular and very interesting, stove species, which, on account of the peculiar mode of its growth (Fig. 118), is popularly known as the Bird's-nest Fern, has a very extensive range of habitat, being a native of Mauritius, the Seychelles, Japan, Bonin, and Chusan, westward to the Society Islands, southward to Queensland, Norfolk Island, and Lord Howe's Island; it is also found in the Peninsula of India, and Beddome, in his excellent books on Indian Ferns, says that it is very abundant in moist woods on the Anamallays at an elevation of 3000ft. to 4000ft. It has also been gathered in Burmah, in Assam, and on the Himalayas. The entire (undivided) fronds, 2ft. to 4ft. long, 4in. to 8in. broad, of a leathery texture and shining nature, rise symmetrically from a single succulent crown, leaving quite a hollow centre at the base; they are of nearly the same breadth throughout, sharp-pointed at their extremity, and gradually taper below into a very short stalk. The sori (spore masses), which occupy the upper half of the frond, are disposed in oblique lines about half-way between the midrib and the margin.—*Hooker*, *Species Filicum*, iii., p. 77. *Nicholson*, *Dictionary of Gardening*, i., p. 132. *Lowe*, *New and Rare Ferns*, t. 36. *Beddome*, *Ferns of Southern India*, t. 123; *Ferns of British India*, t. 197.

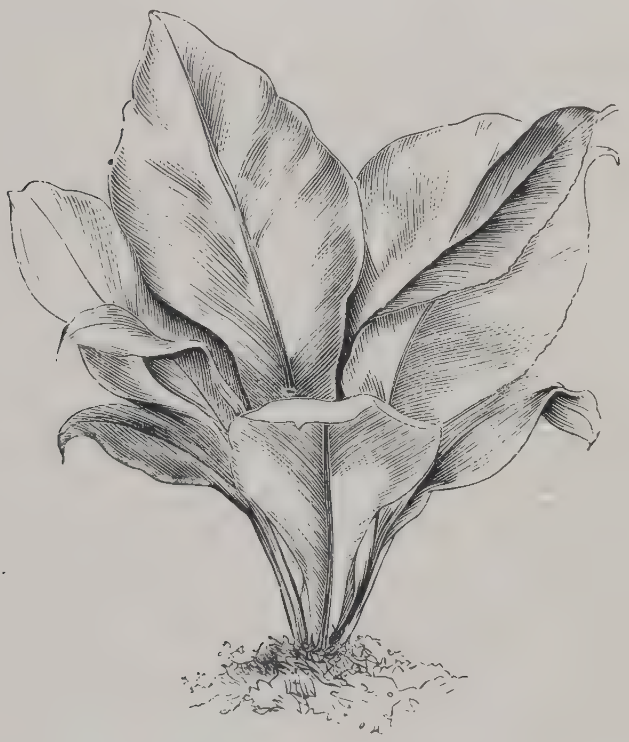


Fig. 118. Asplenium Nidus
(much reduced).

A. Nidus is a Fern which thrives best in a mixture of about equal parts of rough, fibrous peat and chopped sphagnum, for it requires very little soil, most of its nourishment being derived from aërial roots, which are produced freely on the surface of the pot and at the base of the fronds, if the atmosphere is kept in proper condition. This singular species has produced several varieties; the following, however, are the most distinct and the only two generally found in commerce:

A. N. australasicum—aus-tra-las′-ic-um (Australian), *Hooker.*

This variety differs from the typical plant in its fronds being less pointed and having their midrib strongly keeled on the back, also in its habit, as the fronds grow horizontally before taking their upright course, thus forming a circular, deep, vase-shaped hollow.—*Hooker, Synopsis Filicum*, p. 191. *Nicholson, Dictionary of Gardening*, i., p. 132. *Lowe, Ferns British and Exotic*, v., t. 15B.

A. N. musæfolium—mu-sæ-fol′-ĭ-um (Musa-leaved), *Mettenius.*

This most distinct form is also so handsome that Sir W. J. Hooker says "it is unquestionably the most noble of all the genus *Asplenium.*" It differs essentially from the species by its much larger fronds, sometimes 6ft. long and 1ft. broad, which, instead of being of nearly uniform breadth throughout, are of an elliptic-spear-shape, gradually tapering to a narrow wing at the base of their stalks. Besides the above-named characters there is another point essentially distinct: the fronds, instead of growing horizontally at first, are disposed symmetrically all round the succulent crown, and take an upright direction from the start, so as to leave the crown less elevated and less exposed, thus making the hollow centre more funnel-shaped. The sori (spore masses) extend nearly to the edge. This variety is remarkably well adapted for decoration in vases, in which it makes a very pretty object.—*Hooker, Synopsis Filicum*, p. 190. *Lowe, New and Rare Ferns*, p. 90. *Nicholson, Dictionary of Gardening*, i., p. 132.

Although requiring stove heat to grow and develop their handsome fronds properly during the greater part of the year, *A. Nidus* and its varieties stand well out of doors in the summer if not exposed to the full sun, and they prove exceedingly effective when used in the sub-tropical garden. Great care must be taken to keep away slugs and woodlice, which are particularly fond of the young succulent fronds: the most effectual way of preventing these pests from getting at the plants consists in placing the pot over a pan of water, on three inverted pots, so as to prevent its bottom from touching the water, but at the same time leaving a liquid barrier of a couple of inches all round to keep off intruders.

A. (Athyrium) nigripes—Ath-yr′-ĭ-um ; nig′-rip-ēs (having a black foot or stalk), *Blume.*

A greenhouse species, of medium dimensions, much resembling in general habit *A. macrocarpum*, from which, however, it entirely differs by its fructification—its sori (spore masses), linear-oblong in shape and often curved, being disposed principally in two parallel rows close to the midrib of the pinnules (leafits). It is a native of Japan, the Neilgherries, Ceylon, and the Himalayas, where it is found at 10,000ft. elevation.—*Hooker*, *Species Filicum*, iii., p. 227. *Beddome*, *Ferns of Southern India*, t. 157.

A. (Euasplenium) nitens—Eu-as-ple′-nĭ-um ; nit′-ens (shining), *Swartz.*

A very pretty, stove species, native of the Mauritius and Bourbon Islands. Its fronds are 1½ft. to 2ft. long, 6in. to 9in. broad, and are borne on firm, erect, naked and polished stalks 6in. to 9in. long and of a chestnut-brown colour ; they are furnished with from fifteen to twenty pairs of ascending and nearly sickle-shaped leaflets of a leathery texture, which are 4in. to 6in. long, about 1in. broad, terminating in a sharp point, the edge being finely toothed, the base broadly rounded on the upper, and truncate in a curve on the lower, side. The sori (spore masses) are disposed closely and in regular rows which do not extend more than half-way from the midrib to the edge.—*Hooker*, *Species Filicum*, iii., p. 157, t. 195. *Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. (Euasplenium) nitidum—Eu-as-ple′-nĭ-um ; nit′-id-um (shining), *Swartz.*

A pretty and decorative, stove species, native of the Malayan Peninsula and Islands, also of British India, where, according to Beddome, it is found in the Sisparah Ghat, on the Neilgherries, at 4000ft. elevation. Its fronds, 2ft. to 3ft. long and 1ft. broad, are borne on firm, erect, greyish stalks about 1ft. long : they are bipinnate (Fig. 119). The numerous leaflets, of a leathery texture and paler in colour on the under-side, the lowest

6in. to 9in. long and 2in. to 3in. broad, are divided to the rachis (stalk of the leafy portion) into numerous stalked pinnules (leafits); the leafits are again cut into broad, flabellate (fan-shaped) segments, which are rounded at their base and have their outer edge deeply toothed. The sori (spore masses) are disposed near the midrib and nearly straight.—*Hooker*, *Species Filicum*, iii., p. 172. *Nicholson*, *Dictionary of Gardening*, i., p. 132. *Lowe*, *New and Rare Ferns*, t. 18. *Beddome*, *Ferns of Southern India*, t. 148.

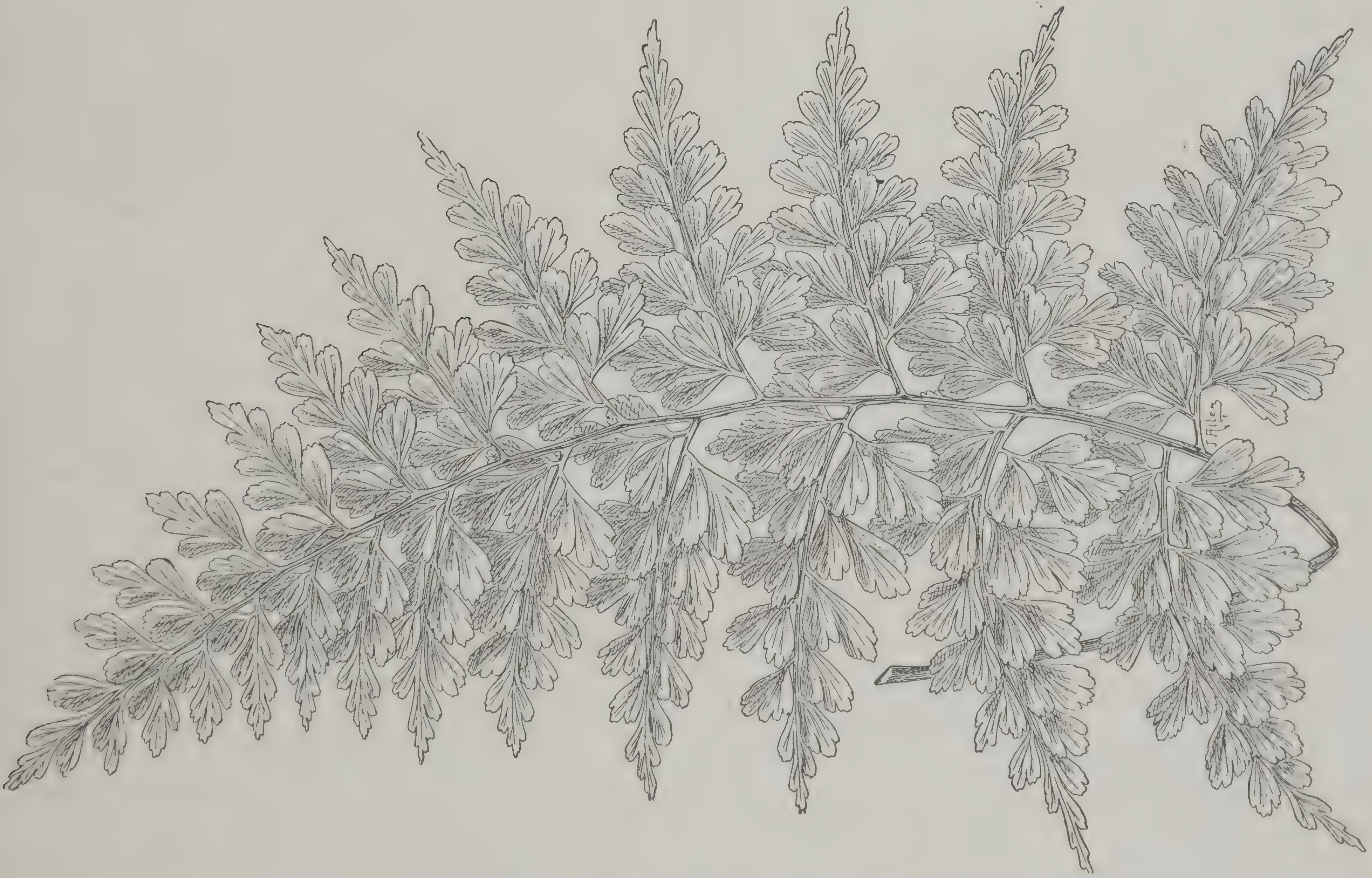


Fig. 119. Frond of Asplenium nitidum

(¼ nat. size).

A. nobile—no′-bil-ĕ (noble). A garden name for a variety of *A. viviparum*.

A. (**Euasplenium**) **normale**—Eu-as-ple′-nĭ-um ; nor-ma′-lĕ (normal), *Don.*

A very pretty, stove species, of dwarf dimensions, native of the Himalayas, the Anamallays, and the Neilgherries, where, according to Beddome, it is common on higher elevations. Its fronds, about 8in. long and 1½in. broad, are borne on wiry, blackish stalks 4in. to 6in. long, and are furnished with numerous closely-placed leaflets of a leathery texture, the lower ones deflexed (thrown back), blunt-pointed, and notched at their edges, the upper side auricled (eared) and suddenly narrowed at the base, the lower one truncate in a straight line. The sori (spore masses) are disposed in two unequal, parallel rows.—*Hooker*, *Species Filicum*, iii., p. 139, t. 188. *Beddome*, *Ferns of Southern India*, t. 133.

A. (**Darea**) **novæ-caledoniæ**—Da′-rĕ-a ; nov′-æ–cal-ed-on′-ĭ-æ (native of New Caledonia), *Hooker*.

This pretty greenhouse species is of medium dimensions ; it produces tripinnate fronds 9in. to 12in. long, 6in. to 9in. broad, borne on firm, upright, naked stalks 6in. to 12in. long. The lower leaflets, of leathery texture and deltoid (in shape of the Greek delta, Δ), are divided into pinnules (leafits) of the same shape, which are in their turn cut into segments of a rigid nature, scarcely flattened, about ½in. long, and distantly placed. The long and narrow sori (spore masses) are disposed on the margin of the segments, which are of a peculiarly dark, shining-green colour.—*Hooker*, *Species Filicum*, iii., p. 213. *Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. obliquum—ob-li′-qŭ-um (oblique). A variety of *A. obtusatum ;* it is of little horticultural value.

A. (**Euasplenium**) **oblongatum**—Eu-as-ple′-nĭ-um ; ob-lon-ga′-tum (oblong), *Mettenius*.

This very distinct, stove species, native of Panama, appears to occupy a position intermediate between *A. alatum* and *A. rhizophorum*. Like those of these two species, its fronds are proliferous at their extremity ; they are spear-shaped, about 1½ft. long, borne on dark brown and distinctly-winged stalks, and furnished with numerous sessile (stalkless), blunt leaflets of a parchment-like texture and of light green colour. The spore masses are disposed close to the midvein.—*Hooker*, *Synopsis Filicum*, p. 484.

A. (**Euasplenium**) **obtusatum**—Eu-as-ple′-nĭ-um ; ob-tu-sa′-tum (obtuse), *Forster*.

This is a very free-growing and perfectly evergreen, greenhouse species, native of New Zealand and Australia, and somewhat resembling our Sea Spleenwort (*A. marinum*). Its fronds, of a thick and fleshy nature, produced from a slowly-creeping rhizome, average about 10in. in height, and are borne on firm, upright stalks 3in. to 6in. long, densely clothed at the base with large, thin, grey, spear-shaped scales. They are oblong in shape and composed of a terminal leaflet of about equal dimensions to the five or six pairs of lateral ones, which are 1in. to 2in. long, somewhat wedge-shaped at the base and obtuse at their extremity, their margins being deeply toothed. The abundant and conspicuous sori (spore masses) are broad and fall short of the edge.—*Hooker*, *Species Filicum*, iii., p. 96. *Nicholson*, *Dictionary of Gardening*, i., p. 132. *Lowe*, *Ferns British and Exotic*, v., t. 5B.

Several variations, which in commerce are usually considered as species, are largely grown for decoration, the most distinct being the following:

A. o. difforme—dif-for′-mĕ (deformed), *R. Brown.*

This differs from the typical plant in its fronds being of a leathery texture and in having their leaflets cut down to a narrow-winged stalk in the lower part into distinctly-separated, roundish or oblong, sinuated leafits.—*Hooker*, *Synopsis Filicum*, p. 207. *Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. o. lucidum—lu′-cid-um (shining), *Forster.*

This, the common *A. lucidum* of commerce, is a very decorative, free-growing form, whose fronds, of a graceful habit and beautiful shining-green colour, often measure 2ft. in length and 1ft. in breadth. The leaflets, which vary from fifteen to twenty on each side of the stalk, are oblong, leathery, 6in. long, $1\frac{1}{2}$in. broad, and narrowed gradually to a long, tapering point; their edge is also more deeply toothed. The long lines of sori (spore masses) are placed so near together that when mature they become confluent, and when in that state the dark brown fructification forms a very pleasing contrast to the vivid colour of the frond. This New Zealand variety is an easily-cultivated plant; although doing well in the mixture recommended for Aspleniums in general, it will be found of a brighter colour and will produce fronds of a more pendulous nature if potted or planted in a mixture of fibrous peat and sand only.—*Hooker*, *Species Filicum*, iii., p. 99. *Nicholson*, *Dictionary of Gardening*, i., p. 132. *Lowe*, *Ferns British and Exotic*, v., t. 4.

A. o. Lyallii—Ly-all′-ĭ-i (Lyall's), *Moore.*

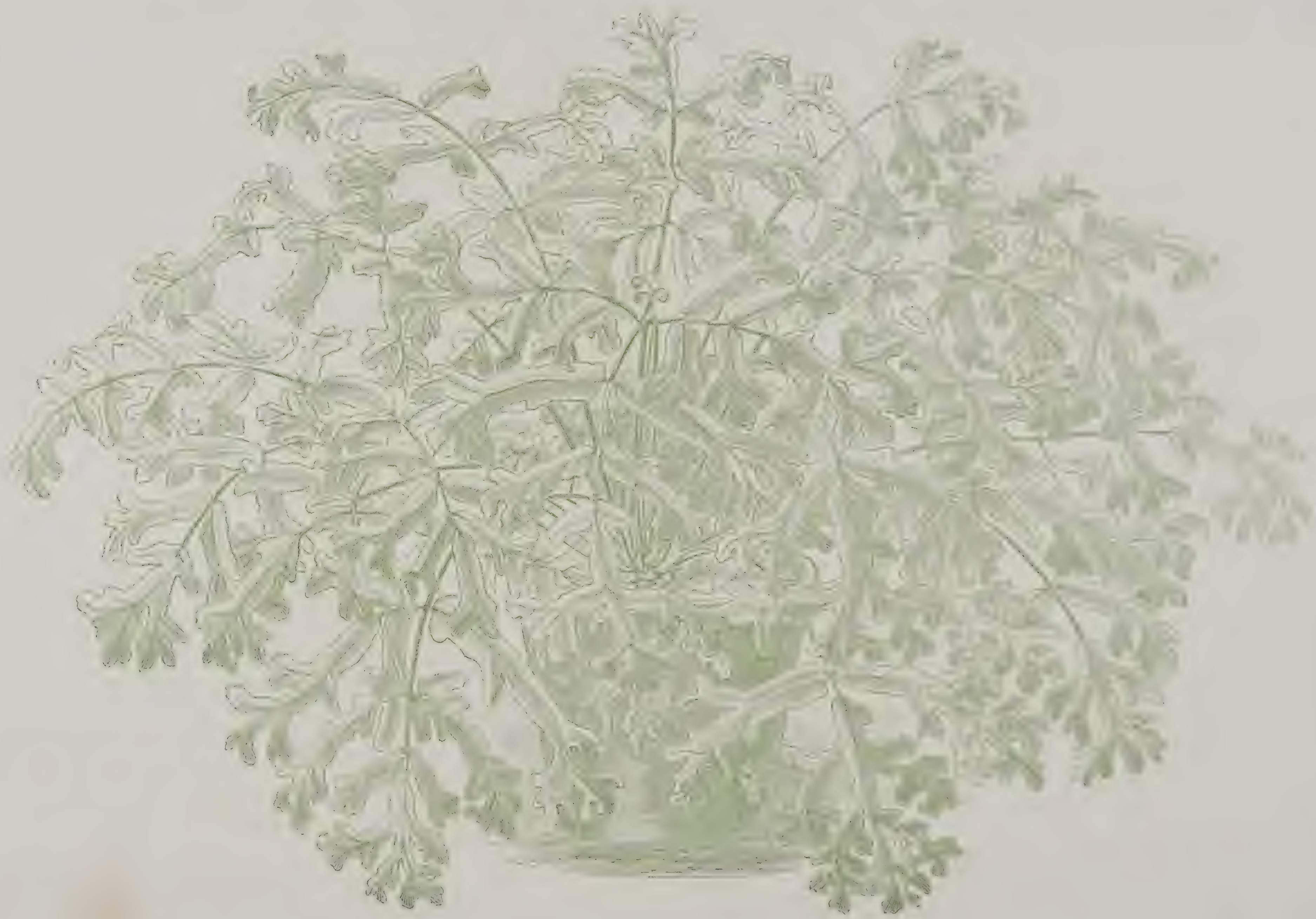
A sub-variety of the preceding, equally native of New Zealand, with fronds 1½ft. long, 9in. broad, furnished with spear-shaped leaflets 6in. long, 3in. broad, and of a thin, papery texture. In the extreme form, the leaflets are cut down into deeply-toothed pinnules (leafits), which are wedge-shaped at the base and distinctly stalked.—*Hooker*, *Flora of New Zealand*, t. 77 ; *Synopsis Filicum*, p. 207.

A. (Euasplenium) obtusifolium—Eu-as-ple′-nĭ-um ; ob-tu-sif-ol′-ĭ-um (obtuse-leaved), *Linnæus.*

A stove species, of medium growth, having a wide range of habitat, as it is found from Mexico and the West Indies to South Brazil. Its simply-pinnate fronds, 1ft. to 1½ft. long and 4in. to 6in. broad, borne on erect, naked stalks 6in. to 9in. long and of a dark green colour, are furnished with from twelve to twenty pairs of stalked, horizontal leaflets 2in. to 3in. long, ½in. broad, of a thin, papery texture and dark green in colour; these leaflets have their edge slightly undulated and their upper side distinctly eared at the base and then suddenly narrowed. The distant sori (spore masses) are disposed in two regular rows and fall short of the edge.—*Hooker*, *Species Filicum*, iii., p. 119, t. 169. *Nicholson*, *Dictionary of Gardening*, i., p. 132.

A. (Darea) obtusilobum—Da′-rĕ-a ; ob-tu-sil′-ob-um (obtusely-lobed), *Hooker.*

This is a very pretty, stove species, of dwarf dimensions, native of the New Hebrides, and one which, on account of its very peculiar mode of growth, is readily distinguished from all other known Aspleniums. In this case, instead of the proliferation being, as is usual in many Aspleniums, located at the extremity of the fronds, it only shows itself on the slender, flagelliform (whip-shaped) growths which start from amongst the fronds at the base of the plant (Fig. 120). These runners, which have all the appearance of undeveloped fronds and which extend to fully 1ft. long, bear at a distance of about every 3in., where they appear as if articulated, a proliferous bud: this, even without its being brought into immediate contact with the soil, produces a young plant, from the base of which several runners



Osmunda regalis japonica corymbifera

($\frac{1}{3}$ nat. size).

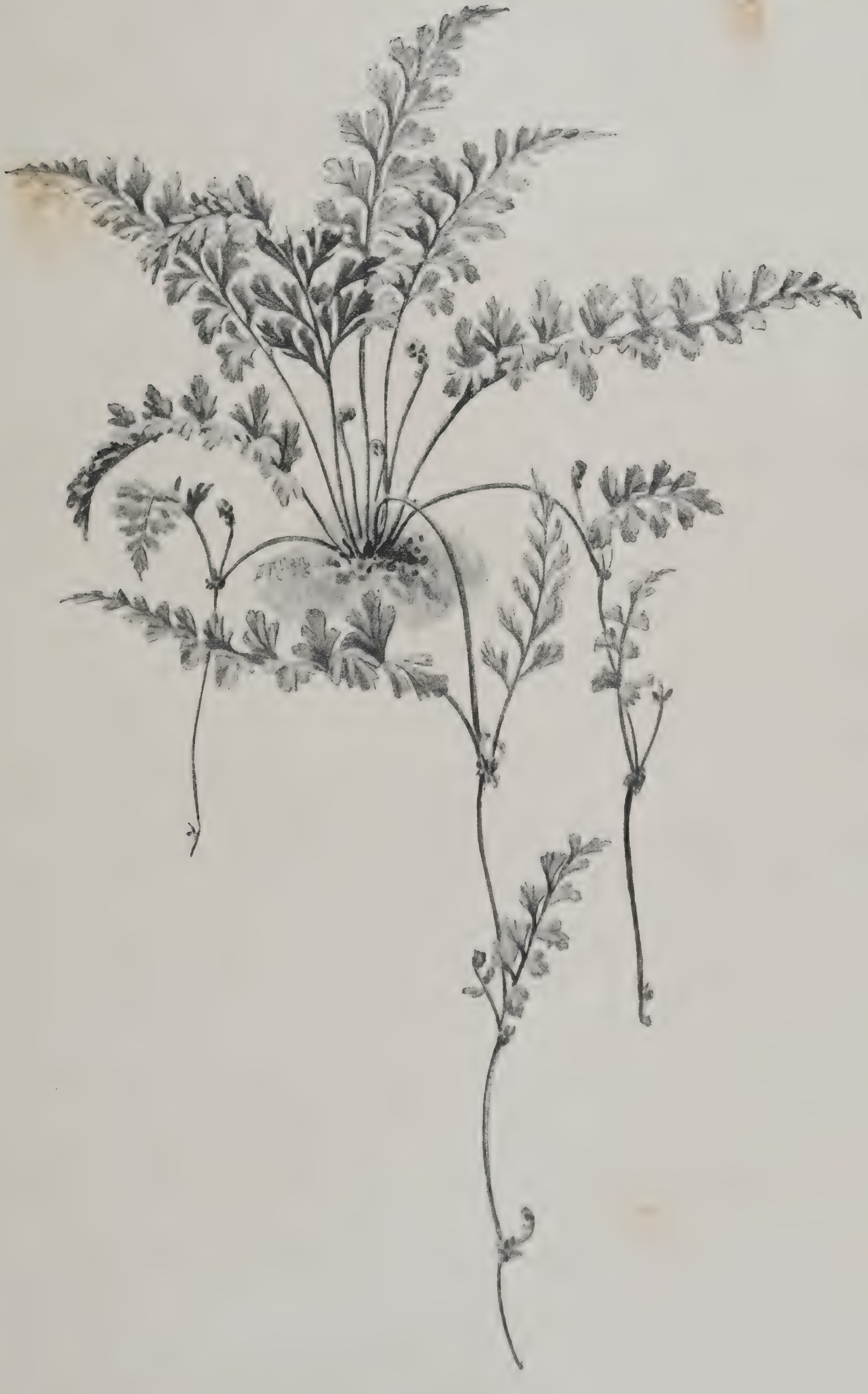


Fig. 120. *Asplenium obtusilobum*
(½ nat. size).

like the one above described will eventually start and produce young plants in their turn. The fronds of *A. obtusilobum*, about 6in. long and 2in. broad, are borne on greenish, naked, tufted stalks about 2in. long. They are furnished with from nine to twelve pairs of leaflets of a papery texture and bright shining-green colour; the largest leaflets are about 1in. long and ¾in. broad, divided into pinnules (leafits), the lowest of which are flabellately cut into three to five linear lobes. The sori (spore masses) are regularly disposed on the margin of the leaflets.—*Hooker*, *Synopsis Filicum*, p. 221. *Nicholson*, *Dictionary of Gardening*, i., p. 133.

A. odontites—od-on-ti′-tēs (toothed). A common garden appellation for *A. flaccidum*.

A. (Athyrium) oxyphyllum—Ath-yr′-ĭ-um; ox-yph-yl′-lum (sharp-leaved), *Hooker*.

This variable, greenhouse species has a very wide range of habitat, being a native of Java and Japan, also of Nepaul, Assam, Bhotan, and the Eastern Himalayas, where it is found up to 7000ft. elevation. Its spear-shaped fronds, 1ft. to 2ft. long and 6in. to 12in. broad, are borne on firm, erect, straw-coloured stalks 6in. to 12in. long, clothed at the base with large, spear-shaped, sharp-pointed, reddish-brown scales. They are furnished with distant leaflets, of a leathery texture, 4in. to 8in. long, 1in. to 2in. broad, divided into spear-shaped pinnules (leafits) which are sometimes auricled (eared) on their upper side and deeply notched. The sori (spore masses), which are provided with an involucre (covering) of oblong-kidney shape, are disposed in two rows on the leaflets, midway between the midrib and the edge.—*Hooker*, *Species Filicum*, iii., p. 221. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Beddome*, *Ferns of British India*, t. 67.

A. (Euasplenium) paleaceum—Eu-as-ple′-nĭ-um; pal-ĕ-a′-cĕ-um (scaly), *R. Brown*.

A pretty little, stove species, native of Tropical Australia, with fronds 6in. to 9in. long, 1½in. to 2in. broad, and borne on spreading, densely scaly stipes (stalks) 1in. to 3in. long. These fronds, which have a somewhat drooping habit and are frequently proliferous at their extremity, are furnished on each side of their midrib with from twelve to twenty sub-sessile pinnæ (almost stalkless leaflets) 1in. long, ½in. broad, of a somewhat leathery texture, and dull green in colour; their point is bluntish and their edge irregularly toothed. The sori (spore masses), abundantly produced on the under-side of the leaflets, are linear (long and narrow) and extend nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 162, t. 199. *Nicholson*, *Dictionary of Gardening*, i., p. 133.

A. (**Darea**) **pallidum**—Da′-rĕ-a; pal′-lid-um (of a pale, undecided colour), *Blume.*

A stove species, of medium dimensions, native of the Philippine and Malayan Islands, also of Luzon, Java, and Moulmein. Its fronds, 1ft. to 2ft. long, 6in. to 12in. broad, and borne on firm, erect, naked stalks 6in. to 12in. long, are furnished with numerous horizontal leaflets the lowest of which are distinctly stalked, 3in. to 6in. long, ½in. broad, and of a somewhat leathery texture. These leaflets terminate in a sharp point, whereas they are rounded at the base, especially on the upper side, and their edge is often sharply toothed. The sori (spore masses) are disposed in regular lines from the midrib very nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 238. *Beddome*, *Ferns of British India*, t. 196.

A. palmatum—pal-ma′-tum (palmate, resembling the palm of the hand). The most popular name for *A. Hemionitis.*

A. parvulum—par′-vul-um (small). A synonym for *A. trilobum.*

A. (**Euasplenium**) **persicifolium**—Eu-as-ple′-nĭ-um; per-sic-if-ol′-ĭ-um (Peach-leaved), *J. Smith.*

A stove species, native of the Philippine and Sandwich Islands, also found, according to Beddome, on the Neilgherries, in Sholas on Dodabell and behind the Avalanche Bungalow. Its oblong-spear-shaped fronds, 2ft. to 3ft. long, are often proliferous at their extremity. The distant and almost stalkless leaflets are of a thin but firm texture, of a dark green colour on both surfaces, 4in. to 5in. long, ½in. to ¾in. broad, distinctly notched throughout, and more wedge-shaped on the upper than on the lower side at the base. The sori (spore masses), about ¼in. long, are regular, parallel, and reach nearly to the midrib and edge.—*Hooker*, *Species Filicum*, iii., p. 109. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Beddome*, *Ferns of Southern India*, t. 128.

A. (Euasplenium) Petrarchæ — Eu-as-ple′-nĭ-um ; Pet-rarch′-æ (Petrarch's), *De Candolle.*

This little gem, native of the South of France, Spain, and Italy, succeeds best when cultivated in the cold greenhouse. It is readily distinguished from *A. Trichomanes* by the glandular character of its fronds, 4in. to 6in. long, and by their more deeply-cut leaflets of a pale green colour. The sori (spore masses), oblong in shape and very short, are disposed from four to six on each side of the midrib.—*Hooker*, *Species Filicum*, iii., p. 138. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Lowe*, *Ferns British and Exotic*, v., t. 38.

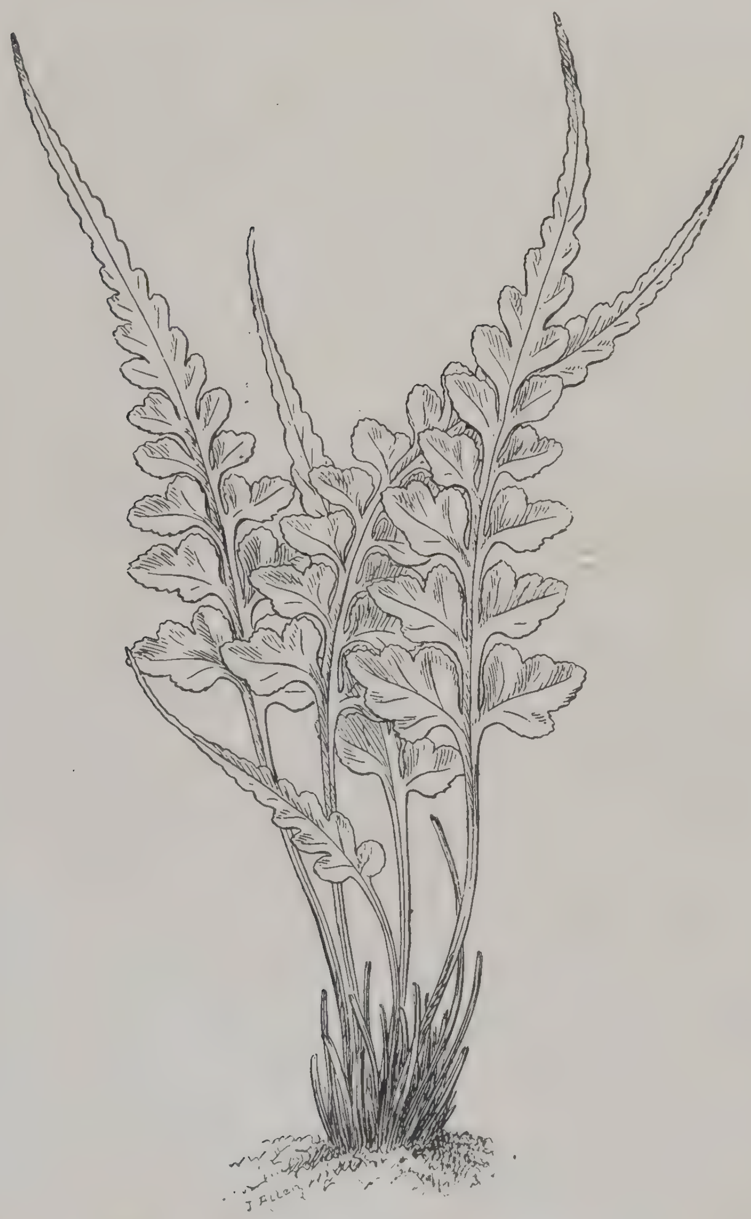


Fig. 121. Asplenium pinnatifidum (½ nat. size).

A. (Euasplenium) pinnatifidum —Eu-as-ple′-nĭ-um ; pin-na-tif′-id-um (pinnately-cleft), *Nuttall.*

This is essentially a greenhouse species, native of North America, having been first discovered in crevices of rocks along the Schuylkill River, near Philadelphia ; then along the Wissahickon Creek, in the same vicinity ; on moist cliffs of sandstone in the Cumberland Mountains, East Tennessee, also in Alabama and at Mine-la-Motte, Southern Missouri. Its singular fronds, of a thin, papery texture, borne on stipites (stalks) 2in. to 4in. long, brown, shining at the base but green higher up, and slightly chaffy when young, are from 3in. to 6in. long, 1½in. broad at the base, from which the general outline tapers to a slender point (Fig. 121), not so long as that of the Walking Leaf of North America, *Scolopendrium* (*Camptosorus*) *rhizophyllum*, to which it bears a certain resemblance, but very rarely if ever rooting at the point. They are of a peculiarly erect habit, somewhat leathery in texture, smooth above, slightly scaly beneath, deeply pinnatifid (divided nearly to the midrib) in the lower and middle portion and sinuately lobed above, the long terminal portion being undulated on the margins. The sori (spore masses) are mostly simple, and very commonly the lower one is situated on the superior side of the lobe; when ripe they nearly cover the back of the frond—even the narrow lobes bear a sorus at each undulation of the margin. —*Hooker*, *Species Filicum*, iii., p. 91. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Eaton*, *Ferns of North America*, i., t. 8. *Lowe*, *New and Rare Ferns*, t. 4B.

A. (Euasplenium) planicaule—Eu-as-ple′-nĭ-um; pla-nic-au′-lĕ (flat-stalked), *Wallich*.

A very distinct, greenhouse species, native of the Himalayas, where it is found up to 6000ft. elevation; it is also indigenous in Ceylon and on the Neilgherries, and, according to Beddome, is very common in most mountainous tracts on the western side of the Madras Presidency, especially on Myhendra Hill, near Berkhampore. Its fronds, 6in. to 12in. long, 2in. to 3in. broad, and borne on erect, greyish, nearly naked stalks 3in. to 6in. long, are furnished with fifteen to twenty pairs of distinctly-stalked, horizontal leaflets, about 1½in. long and only ¼in. broad, of a leathery texture and sharply pointed, while their edge is often deeply lobed more than half-way down and deeply notched. The sori (spore masses) are abundantly produced and reach nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 163, t. 200B. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Beddome*, *Ferns of Southern India*, t. 139. *Lowe*, *Ferns British and Exotic*, v., t. 10.

A. (Diplazium) plantagineum — Dip-laz′-ĭ-um; plan-ta-gin′-ĕ-um (Plantain-like), *Linnæus*.

A stove species, of small dimensions, found wild from Mexico and the West Indies southward to Brazil. Its fronds, of a leathery texture, 6in. to 9in. long and 2in. to 3in. broad, are borne on firm, erect stalks about 6in.

long; they are simple (undivided), terminating in a sharp point, but rounded at the base, and their edge is slightly undulated and toothed upwards; occasionally they are lobed at the base. The linear sori (spore masses) sometimes extend from the midrib to the edge.—*Hooker, Species Filicum*, iii., p. 237. *Nicholson, Dictionary of Gardening*, i., p. 133.

A. (Euasplenium) polyodon—Eu-as-ple′-nĭ-um; pol′-ў-od-on (many-toothed), *Forster.*

This very handsome, greenhouse species, native of New Zealand, is rendered particularly attractive through the vivid green colour of its fronds, 2ft. long, produced from a creeping rhizome, and the conspicuous nature of its spore masses. The leaflets, fully 2in. long and of a leathery texture, are broadly wedge-shaped at the base, deeply toothed on the margin, and hairy. The sori (spore masses) are oblique, commencing at the midvein of each leaflet and extending nearly to the edge, eventually becoming more or less confluent.—*Lowe, Ferns British and Exotic*, v., t. 33B.

A. polyphyllum — pol-yph-yl′-lum (many-leaved). Synonymous with *A. acuminatum.*

A. (Diplazium) polypodioides — Dip-laz′-ĭ-um; pol-yp-od-ĭ-ŏ-i′-des (Polypod-like), *Mettenius.*

A very robust-growing, greenhouse species, native of Southern and British India and found on the Himalayas up to an elevation of 8000ft. Its ample fronds, fully 4ft. long and 2ft. broad, are produced from an erect, nearly arborescent stem and borne on stout, green stalks 1ft. long or more. The eight or nine leaflets with which they are furnished on each side of the midrib are about 1ft. long and 6in. broad, of a thin, papery texture and bright green colour; they are divided into numerous pinnules (leafits) which in their turn are cut into narrow-oblong and slightly-toothed lobes. The sori (spore masses) fall distinctly short of the edge.—*Hooker, Species Filicum*, iii., p. 257. *Beddome, Ferns of British India*, t. 293.

A. (Darea) Powellii—Da′-rĕ-a; Pow-ell′-ĭ-i (Powell's), *Baker.*

A very finely-divided, strong-growing, stove species, native of Samoa. Its fronds are 2ft. to 3ft. long, 1ft. to 1½ft. broad, five times pinnatifid (cut nearly to the midrib), and furnished with numerous imbricated pinnæ (overlapping leaflets), the lowest of which are quite 1ft. long and 4in. broad, of a thin, papery texture and bright green in colour. The pinnæ are divided and subdivided, their ultimate segments being linear (long and narrow), ⅛in. to ⅙in. long, and $\frac{1}{36}$in. broad. The solitary sori (spore masses) are small, linear-oblong, and disposed very close to the margin of the segments.—*Hooker*, *Synopsis Filicum*, p. 224.

A. (Euasplenium) præmorsum — Eu-as-ple′-nĭ-um ; præ-mor′-sum (bitten), *Swartz.*

This is a very variable, greenhouse species, found wild in the West Indies, Australia, Teneriffe, and the Canary Islands. From its good constitution and also on account of its general appearance it is a popular favourite, for its beautifully-arching fronds, sometimes 3ft. long, are among the most decorative of the genus ; they are produced from a slightly-creeping rhizome, bipinnate (twice divided to the midrib), and furnished with elongated leaflets of a leathery texture and dark green in colour, narrowing to a point and divided into pinnules (leafits) with a sharply-toothed margin. The sori (spore masses) are disposed in narrow, oblique lines extending from the midvein to very near the edge of the pinnules.—*Lowe*, *Ferns British and Exotic*, v., t. 7.

A. prolongatum—pro-lon-ga′-tum (prolonged), *Hooker.*

This is a variety of *A. rutæfolium*, from which it essentially differs through its fronds terminating in a long, tail-like process bearing a solitary bulbil at its extremity.

A. (Euasplenium) pulchellum—Eu-as-ple′-nĭ-um ; pul-chel′-lum (pretty), *Raddi.*

A very elegant, stove species, of small dimensions, native of Tropical America, from Columbia to Peru and Rio Janeiro. Its fronds, 4in. to 6in. long, 1in. to 1½in. broad, and borne on slender, naked, greenish stalks 1in. to 2in. long, are furnished with twelve to eighteen pairs of leaflets, of thin, papery texture, about ½in. long, bluntish at their extremity and narrowed suddenly at their base. The sori (spore masses), of a bright reddish-brown colour, narrow and oblique, fall short of the edge; sometimes one or two may be seen almost parallel with the midrib on the lower side of it.—*Hooker, Species Filicum*, iii., p. 129. *Nicholson, Dictionary of Gardening*, i., p. 133. *Lowe, Ferns British and Exotic*, v., t. 31A.

A. (Euasplenium) pumilum—Eu-as-ple′-nĭ-um; pu′-mil-um (small), *Swartz.*

This rare and very pretty, stove species, native of the West Indies, is thoroughly distinct through the semi-transparency of its triangular fronds, 4in. to 6in. each way; their upper part is only sinuated, while the lower part is cut down to the midrib into distinct leaflets, of which the lowest pair are much the largest, being sometimes 2in. long. The sori (spore masses) are small, covered with red hairs, and occasionally become confluent (joining one another).—*Hooker, Species Filicum*, iii., p. 174. *Nicholson, Dictionary of Gardening*, i., p. 133. *Lowe, Ferns British and Exotic*, v., t. 31B.

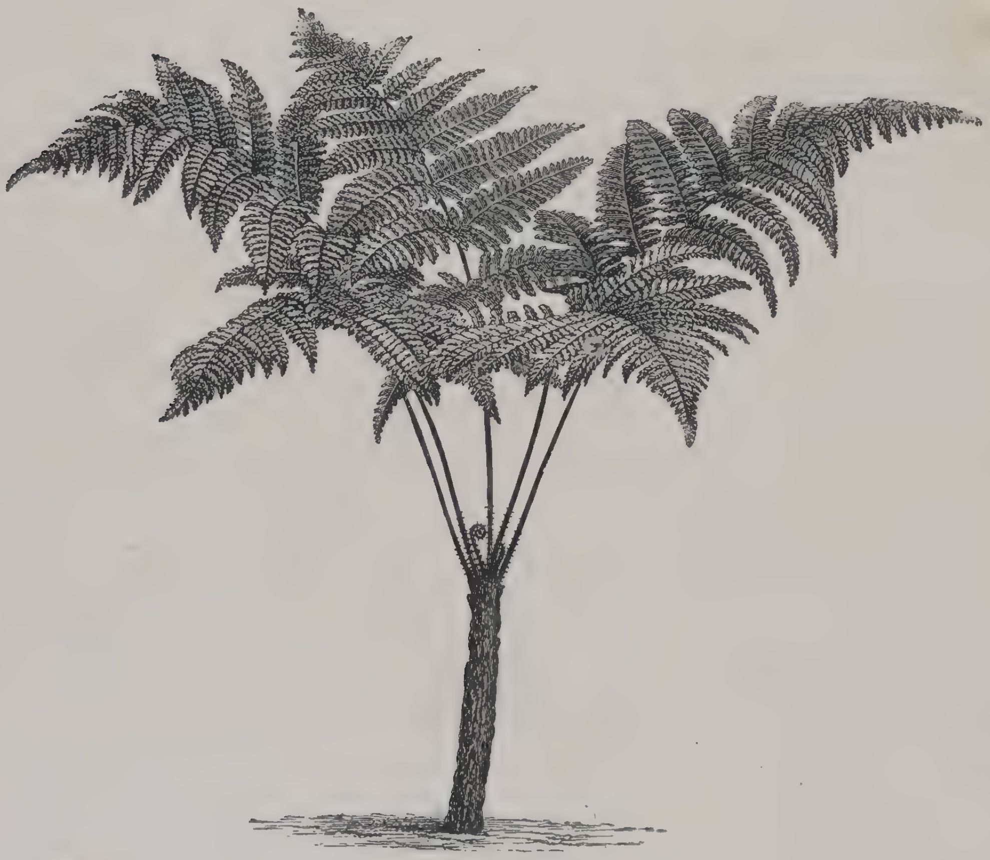


Fig. 122. Asplenium radicans
(much reduced).

A. rachirhizon—rach-irh-i′-zon (rachis-rooting). A variety of *A. rhizophorum.*

A. (Diplazium) radicans—Dip-laz′-ĭ-um; ra-di′-cans (rooting), *Schkuhr.*

A gigantic, stove species, native of South America, with fronds 3ft. to 5ft. long and 2ft. to 3ft. broad, borne on strong, erect stipes (stalks) 1ft. to 2ft. long and scaly below, produced from an erect caudex forming quite an arborescent stem (Fig. 122). The lower leaflets are from 1ft. to 1½ft. long, 6in. to 8in. broad, and divided into numerous spear-shaped, sessile pinnules (stalkless leafits) of a papery texture: the upper leafits are entire;

the lower ones are 3in. to 4in. long, 1in. broad, with broad, blunt lobes reaching half-way down to the midrib. The sori (spore masses) are prominent, the lower ones being sometimes ¼in. long. This species is also known as *A. giganteum*.—*Hooker*, *Species Filicum*, iii., p. 261. *Nicholson*, *Dictionary of Gardening*, i., p. 133.

A. (**Euasplenium**) **Rawsoni**—Eu-as-ple′-nĭ-um ; Raw′-son-i (Rawson's), *Baker*.

A pretty little, greenhouse species, indigenous in the Muizenberg Mountain, Cape Colony, with fronds only 3in. or 4in. long, of a somewhat leathery texture, dull green in colour, and bipinnate (twice divided to the midrib). The sori (spore masses), situated on the midvein, become confluent in an irregular mass filling up the centre of the pinnule (leafit).—*Hooker*, *Synopsis Filicum*, p. 487.

A. reclinatum—rec-li-na′-tum (reclining). A variety of *A. lunulatum* with fronds copiously proliferous at their extremity.

A. refractum—ref-rac′-tum (abruptly bent back), *Moore*.

This singular Fern, which is given by Moore in his "Nature-printed Ferns" as a species, was originally found in Scotland by a gardener, who gathered it for *A. viride*. Hooker and Baker, however, recognise it only as a variety of *A. fontanum*, from which it differs by its fronds being longer and narrower in proportion and by their leaflets being refracted (suddenly thrown back) in a remarkable degree and less divided. It is also distinct from that species in its spreading habit of growth and in its proliferous fronds, the small bulbils being mostly formed at the base of the leaflets. The short and oblong sori (spore masses) are disposed in a line on each side near the midvein of the leaflets.—*Hooker*, *Synopsis Filicum*, p. 216. *Lowe*, *Ferns British and Exotic*, v., t. 35A.

A. (**Euasplenium**) **repens** — Eu-as-ple′-nĭ-um ; re′-pens (creeping), *Hooker*.

A stove species, of small dimensions, native of the Andes of Ecuador, having fronds only 2in. long, bipinnatifid (twice cut nearly to the midrib), furnished with horizontal leaflets of thin texture, divided into wedge-shaped pinnules (leafits) sharply toothed on the outer edge and sometimes deeply cleft, on which the sori (spore masses), oblong in shape, are solitary.—*Hooker*, *Species Filicum*, iii., p. 194.

A. (Euasplenium) resectum—Eu-as-ple′-nĭ-um ; res-ec′-tum (cut or pared), *Smith.*

This greenhouse species, of Indian origin, is widely distributed. On the Himalayas it is found up to 8000ft. elevation, and, according to Beddome, it is also found on the Neilgherries, Anamallays, and Pulnies, where it is very common at elevations of 3000ft. to 5000ft. Its fronds, 6in. to 15in. long, 2in. to 4in. broad, and lanceolate-oblong in shape, have a very peculiar appearance through the almost stalkless, horizontal leaflets with which they are furnished being almost dimidiate (two-thirds of the lower side being entirely cut away). They have their point bluntish and are of a thin, papery texture. The sori (spore masses) do not reach either the midrib or the edge.—*Hooker*, *Species Filicum*, iii., p. 130. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *Beddome*, *Ferns of Southern India*, t. 132.

A. (Euasplenium) rhizophorum—Eu-as-ple′-nĭ-um ; rhi-zoph′-or-um (root-bearing), *Linnæus.*

This very handsome, stove species, native of Tropical America, where it is found from Mexico and the West Indies southward to Peru, is exceedingly variable in cutting, and may be best recognised by its elongated rachis bearing a solitary bulbil at its extremity. The typical species is a plant with fronds 1ft. to 2ft. long, 4in. to 6in. broad, borne on naked, firm, erect stipes (stalks) 4in. to 8in. long and of a chestnut-brown colour. These are furnished with from twelve to thirty pairs of simple pinnæ (undivided leaflets) 1½in. to 2in. long, about ½in. broad, spreading horizontally, of a papery texture, and with the two sides unequal, the upper side eared and narrowed, the lower one obliquely wedge-shaped (Fig. 123). The sori (spore masses) do not reach either the midrib or the edge.—*Hooker*, *Species Filicum*, iii., p. 122, t. 187A. *Nicholson*, *Dictionary of Gardening*, i., p. 133.

As an illustration of the variability of this species, we may here note that the varieties *A. cyrtopteron* and *A. flabellatum* of Kunze have their leaflets deeply lobed and pinnatifid (cut nearly to the midrib), especially in the lower half, while the plant called *A. rhizophorum* by Swartz is conspicuously twice divided to the midrib. The most elegant and distinct form in cultivation is the following:

A. r. rachirhizon—rach-irh-i′-zon (rachis-rooting), *Raddi.*

This is a very delicate-looking and extremely handsome Fern, native of Brazil and the West Indies. On account of its gracefully-pendulous habit it is well adapted for growing in a hanging basket, in which position it shows to great advantage the beauty of its fronds: these are 1½ft. to 2ft. long, smooth, and of a deep green colour, and they are borne on black, polished, flexible, slightly-winged stipes (stalks); their leaflets are cut into pinnules (leafits) that are distinctly separated and again cut into narrow segments. The fronds terminate in a long, tail-like process, bearing at its extreme end a bulbil which roots very freely when brought into contact with

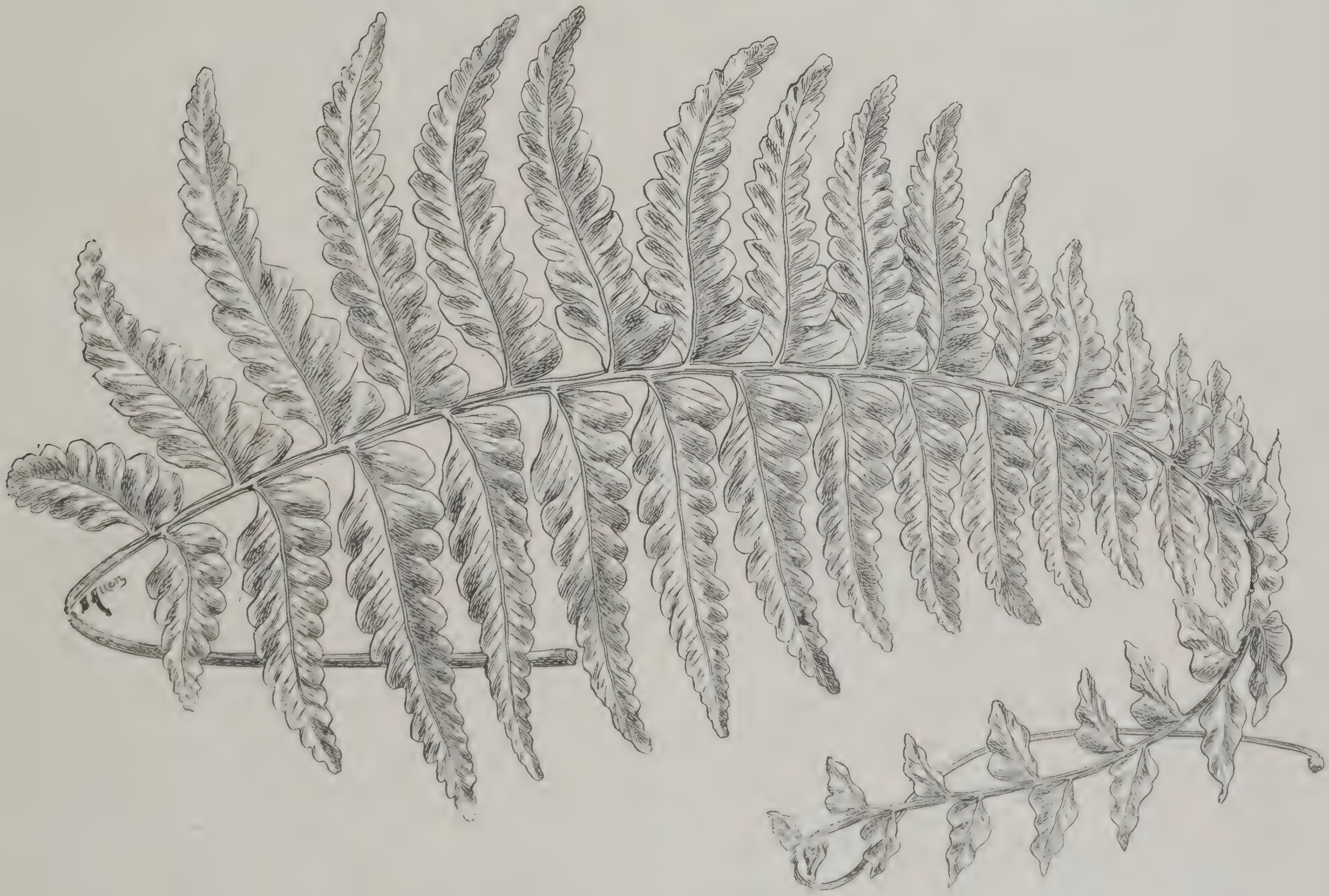


Fig. 123. Frond of Asplenium rhizophorum
(nat. size).

either the soil or the moss of the basket: even the pinnæ are frequently proliferous at their extremity.—*Lowe*, *Ferns British and Exotic*, v., t. 34. *Hooker*, *Synopsis Filicum*, p. 205.

A. (Euasplenium) rhizophyllum—Eu-as-ple′-nĭ-um; rhi-zoph-yl′-lum (leaf-rooting), *Kunze.*

A very handsome, greenhouse species, native of Tropical America and the Polynesian Islands, with fronds 6in. to 12in. long, 1½in. to 2in. broad, borne on greyish, naked stalks 2in. to 6in. long, and cut down into numerous horizontal leaflets of a thin, papery texture. These leaflets are closely set, cut down throughout nearly to the midrib into simple or forked pinnules (leafits), and are about 1in. long and ¼in. broad. The sori (spore masses) are disposed one only to each pinnule and close to its margin.—*Hooker*, *Species Filicum*, iii., p. 200. *Nicholson*, *Dictionary of Gardening*, i., p. 133. *A. rhizophyllum* of Linnæus, better known as *Camptosorus rhizophyllus*, is now classified under *Scolopendrium.*

A. (Darea) Richardi—Da′-rĕ-a; Rich-ard′-i (Richard's), *Hooker.*

A greenhouse species, of small dimensions, its leathery fronds seldom exceeding 10in. in height including their stalks. It is a native of New Zealand, and one which seems near some of the dwarf tripinnatifid forms of the popular *A. flaccidum.*—*Hooker*, *Species Filicum*, iii., p. 197.

A. (Darea) rutæfolium—Da′-rĕ-a; ru-tæ-fol′-ĭ-um (Rue-leaved), *Kunze.*

This is a beautiful, greenhouse species (see Plate), native of Cape Colony, Natal, Zambesi Land, the Himalayas, Ceylon, and Japan. Its fronds, 6in. to 15in. long, 2in. to 3in. broad, and borne on compressed, greenish, naked stipes (stalks) 6in. to 9in. long, are of a somewhat erect habit and furnished with from twelve to twenty pairs of leaflets, of a leathery texture and bright shining-green colour, 2in. or more long and cut down to the rachis (stalk of the leafy portion) into numerous distant pinnules (leafits); the lowest of the leafits on the upper side are again cut into linear segments, on the margin of which the small and abundant sori (spore masses) are usually disposed.—*Hooker*, *Species Filicum*, iii., p. 206. *Nicholson*, *Dictionary of Gardening*, i., p. 133.

A. r. prolongatum—pro-lon-ga′-tum (prolonged), *Hooker.*

This is a variety which, on account of the drooping habit of its fronds and of their highly proliferous nature, is very distinct from the original species. It is indigenous in Southern India, and, according to Beddome, is abundant on the Shevagherry Hills, although rare in other localities. Its fronds, 4in. to 6in. long, of the same leathery texture as those of the species, suddenly terminate in a caudate (tail-like), naked extension of the rachis, 1in. to 2in. long, having at its extremity a proliferous bulbil. The leaflets are divided and subdivided much in the same way as those of *A. rutæfolium*, but they are less closely placed, and the spore masses are disposed on the margin of the pinnules as is the case in the species.—*Hooker, Species Filicum*, iii., p. 209. *Beddome, Ferns of Southern India*, t. 138.

A. (Euasplenium) Ruta-muraria — Eu-as-ple′-nĭ-um ; Ru′-ta–mu-ra′-rĭ-a (Wall-Rue), *Linnæus.*

This singular little Fern, which derives its name from the great resemblance of its fronds to the leaves of the common Rue and also from its most natural position, as it is rarely found growing wild anywhere but in the mortar on old walls, is of a particularly cosmopolitan character. In Continental Europe it is found from France to Italy, Spain, and Portugal, and from Belgium to Germany, Russia, and Norway. It is equally found wild in Algeria, in Cashmere, Tibet, and Siberia ; while as a North American Fern, Eaton tells us that "the Wall-Rue is found in clefts of calcareous rocks from Vermont to North Carolina and westward to Indiana and Tennessee," but that "it is not seen on walls in America." Yet this is the situation in which this curious and interesting Fern, of a peculiar bluish colour and distinct from all other British species, is usually found in England, where it mostly inhabits the Southern and Midland Counties, on either brick or stone walls, more especially on the northern side, and preferring to mount up the walls as high as possible. It is in such positions that we have gathered it on the walls of Ragley Hall, in Warwickshire, where it grows in company with the Maidenhair Spleenwort (*A. Trichomanes*) ; in drier situations it dwells alone, whereas in moister localities it generally has as its companions *Cystopteris fragilis* and *A. Ceterach* (or, as it is most commonly called, *Ceterach officinarum*). It is found principally in the Isle of Wight and

North and South Wales; in Ireland; in the islands of Anglesey, Orkney, Jersey, &c.

From the following quotation from Gerarde it will be seen that the Wall-Rue was known as one of our native Ferns by some of our earliest botanists: "The Stone-Rue groweth upon old walls near unto waters, wells, and fountains. I have found it upon the walls of Dartford Church, in Kent, hard by the water-side, where the people ride through; also upon the walls of the churchyard of Sittingbourne, in the same county, in the middle of the town, hard by a great lake of water; and also upon church walls of Rayleigh, in Essex, and in divers other places." Matthiolus was the first to call it *Ruta-muraria*, or rather *Ruta-muralis*, and Gerarde names it after him "Wall-Rue or Rue Maidenhair" as well as "Stone-Rue."

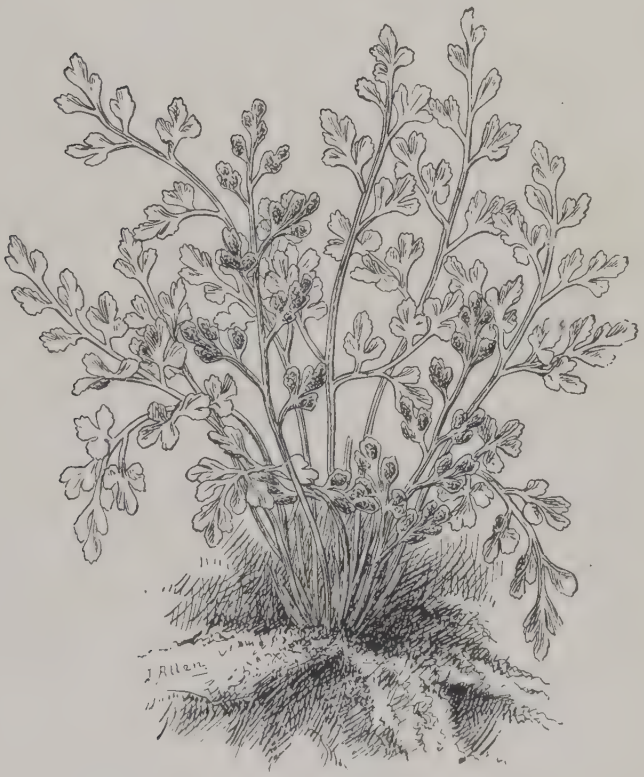


Fig. 124. Asplenium Ruta-muraria (nat. size).

The little fronds of *A. Ruta-muraria*, 1in. to 2in. long, 1in. broad, and borne on slender, wiry stalks 2in. to 4in. long and black towards the base, are provided with a few leaflets, the lower ones of which are again cut into spoon- or wedge-shaped pinnules (leafits) finely toothed round the edges. The sori (spore masses) are linear (much longer than broad), and vary in number according to the size and shape of the pinnules, which they entirely cover when fully developed (Fig. 124).—*Hooker*, *Species Filicum*, iii., p. 176. *Lowe*, *Our Native Ferns*, ii., t. 48; *Ferns British and Exotic*, v., t. 27. *Beddome*, *Ferns of British India*, t. 61. *Eaton*, *Ferns of North America*, i., t. 15.

The Wall-Rue is a somewhat difficult plant to manage under artificial treatment, its removal from its native place being seldom attended with success. The best time to uproot it is in April, as it only starts into growth about May, when it produces young fronds which retain their freshness all through the winter. This Fern requires free exposure to air, and a soil composed of rough lime-rubbish, sand, and leaf-mould, with thorough drainage and a position naturally moist and shady. Whether grown in pots or planted in the Fernery, it is very important that the crowns should be kept well above the surface of the soil, so as to prevent water from resting on them.

Several forms of the Wall-Rue are known in cultivation, but on account of their small dimensions even the most distinct are not very conspicuous. The following, however, are the most worthy of notice and are figured in Lowe's "Our Native Ferns":

A. R.-m. attenuatum—at-ten-ŭ-a′-tum (diminished), *Lowe.*

An unusually large-growing form, found at Athlone, and one which produces fronds 5in. to 6in. long, borne on stalks about 4in. long, and furnished with large leaflets that are laciniate (torn) at the summit.—*Lowe, Our Native Ferns*, ii., p. 223, fig. 587.

A. R.-m. cristatum—cris-ta′-tum (crested), *Wollaston.*

A very variable form, having some of its fronds tasselled at their extremity, others with apical lobes folded on each other, pinnules (leafits) narrowish, those towards the point of the frond or leaflets enlarged at their tips and somewhat crispy. It was originally discovered near Ruthin Castle, Denbighshire, and has also been found near Guildford and near Tunbridge Wells.—*Lowe, Our Native Ferns*, ii., p. 225, fig. 592.

A. R.-m. cuneatum—cun-ĕ-a′-tum (wedge-shaped), *Moore.*

A form with fronds simply pinnate, originally discovered at Stenton Rock, near Dunkeld, Perthshire; it has also been found near Bristol.—*Lowe, Our Native Ferns*, ii., p. 224, fig. 590.

A. R.-m. proliferum—pro-lif′-er-um (bulbil-bearing), *Wollaston.*

A proliferous form, originally found near Guildford, and characterised by young plants being situated in the axils of the leaflets.—*Lowe, Our Native Ferns*, ii., p. 226.

A. R.-m. ramo-depauperatum—ra′-mo-de-paŭ-per-a′-tum (branched and impoverished), *Clapham.*

A form with branched and depauperated fronds borne on exceedingly long stalks and furnished with leaflets variable in size and form. It was found growing wild at Settle by Mr. A. Clapham, of Ramsdale Bank, Scarborough.—*Lowe*, *Our Native Ferns*, ii., p. 223, fig. 586.

A. R.-m. ramosum—ra-mo′-sum (branched), *Moore.*

A variety with fronds branching in the stalk among and below the leafits. Found at Arnside and also at Settle.—*Lowe*, *Our Native Ferns*, ii., p. 224, fig. 589.

A. R.-m. trifoliatum—trif-ol-ĭ-a′-tum (three-leaved), *Lowe.*

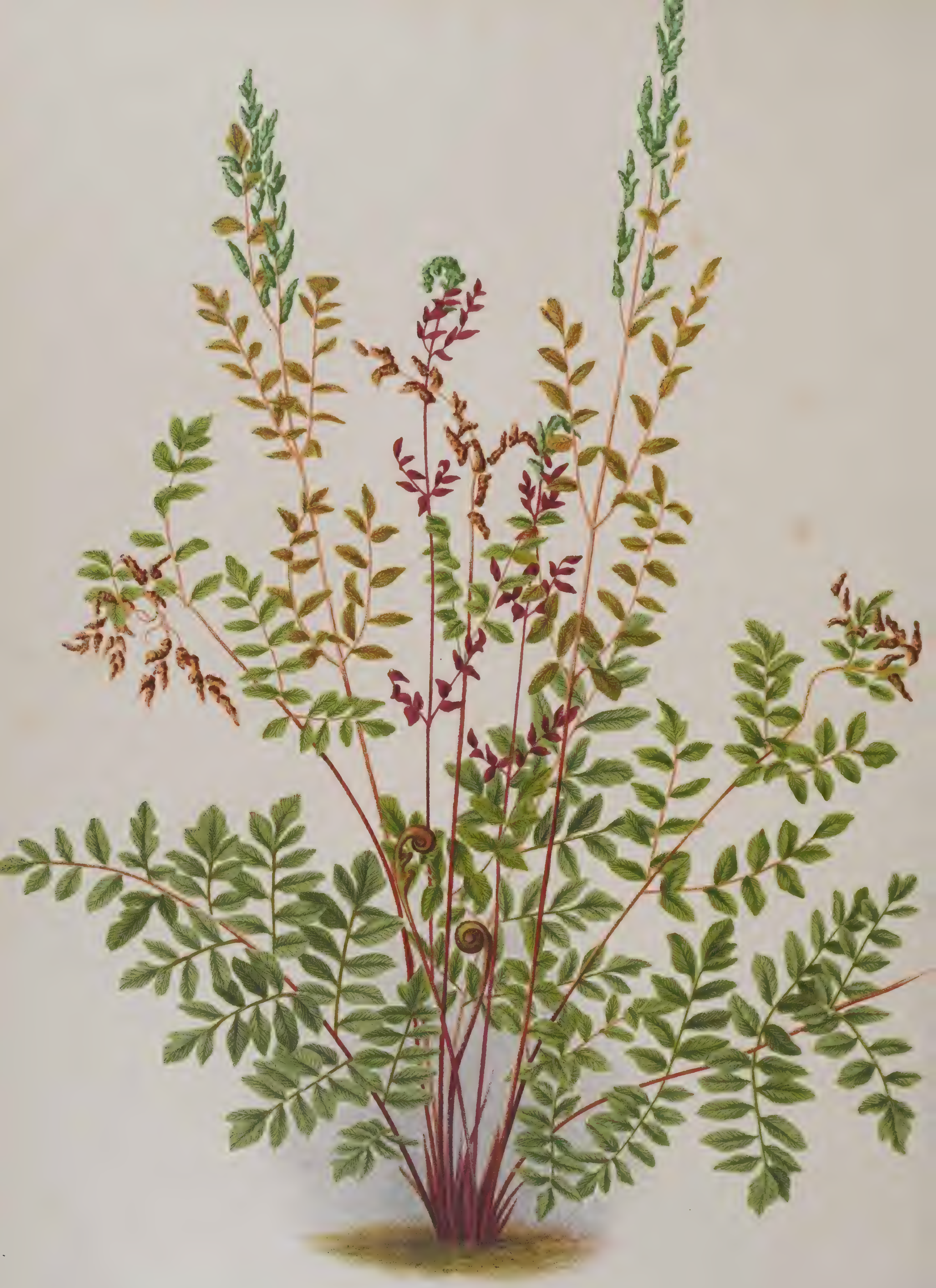
A dwarf variety, with small, nearly round, leafits, three on each branch, all shortly stalked. Found at Bittadon, near Barnstaple, Devonshire.—*Lowe*, *Our Native Ferns*, ii., p. 224, fig. 588.

A. (Euasplenium) salicifolium — Eu-as-ple′-nĭ-um ; sal-ic-if-ol′-ĭ-um (Willow-leaved), *Linnæus.*

A stove species, of medium dimensions, native of the West Indies, with fronds 1ft. to 1½ft. long, 6in. to 9in. broad, borne on stalks 6in. to 12in. long, and furnished with numerous distinctly-stalked and often horizontal leaflets of a thin texture, on which the sori (spore masses) fall short of both edge and midrib.—*Hooker*, *Species Filicum*, iii., p. 112. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. (Euasplenium) Sandersoni — Eu-as-ple′-nĭ-um ; San-der-so′-ni (Sanderson's), *Hooker.*

This pretty and very distinct, greenhouse species (Fig. 125) is a native of Natal, Zambesi Land, and Johanna Island. Its slender, graceful fronds, 6in. to 9in. long, ½in. broad, and usually proliferous (bud-bearing) at their extremity, are borne on green stalks 1in. to 2in. long and slightly scaly. They are furnished with from twelve to twenty pairs of horizontal pinnæ (leaflets) about ½in. long, shortly stalked, of a peculiar dimidiate form (fully developed on one side of the midrib and scarcely at all on the other), and deeply toothed on the upper edge, the lower one being nearly straight, quite entire, and curved backwards. The texture is thin and papery, and the oblong sori (spore masses) are disposed from one to three to each leaflet. The small size of the fronds and the well-defined characters of its pinnæ give this Fern a very elegant aspect and render it most interesting and useful for small



baskets.—*Hooker, Species Filicum*, iii., p. 147, t. 179. *Nicholson, Dictionary of Gardening*, i., p. 134.

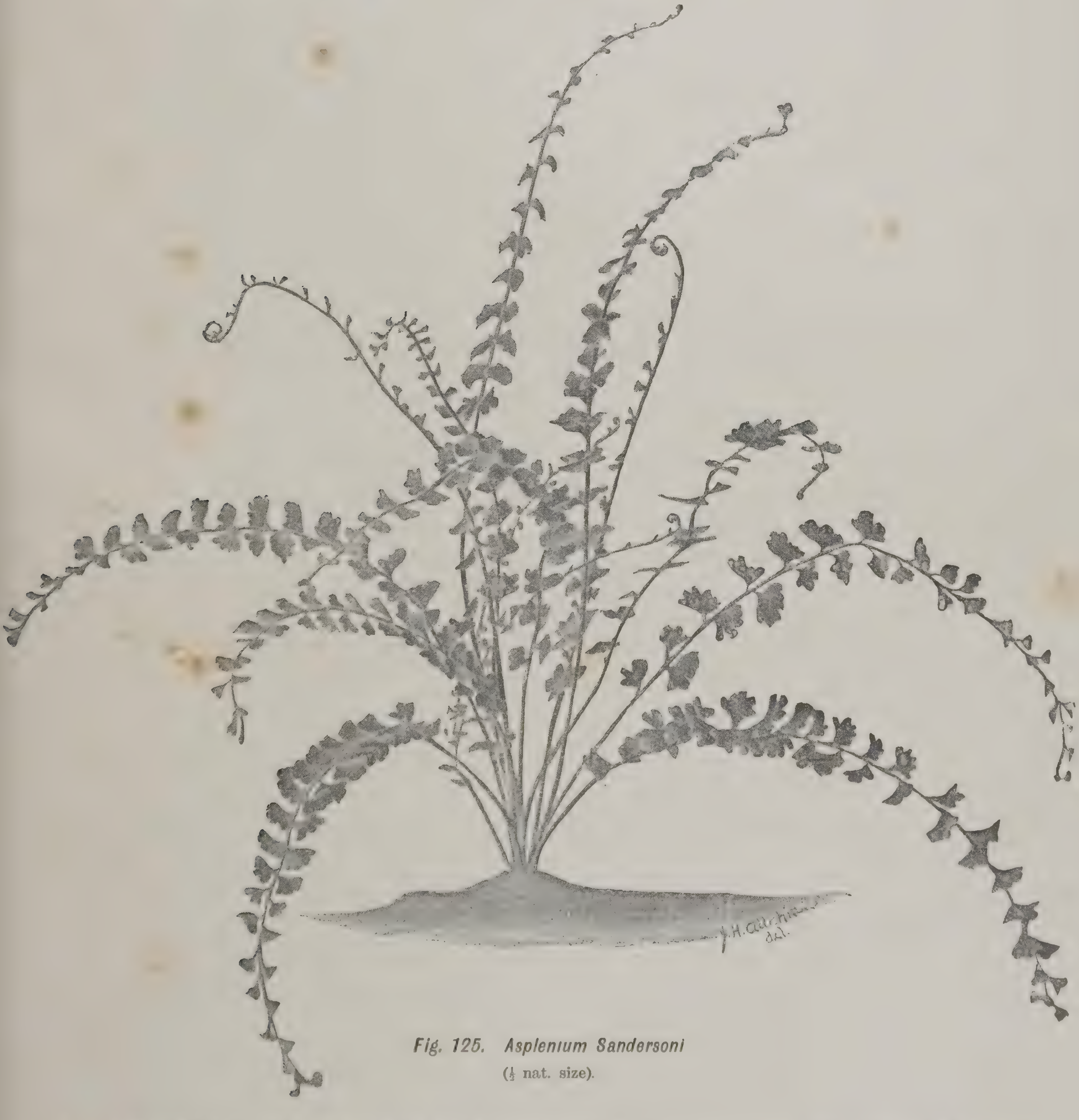

J.H. Aitchison del.

Fig. 125. Asplenium Sandersoni
(½ nat. size).

A. (Diplazium) sandwichianum—Dip-laz′-ĭ-um ; sand-wich-ĭ-a′-num (from the Sandwich Islands), *Mettenius.*

The fronds of this robust-growing, stove species, 2ft. to 3ft. long and 1½ft. to 2ft. broad, are borne on dark brown, woolly stalks fully 2ft. long and furnished at the base with egg-shaped scales of a peculiar nature, being dark brown and fleshy in the centre and furnished with a broad, suddenly thin, dry, and membranous margin. The pinnæ (leaflets), of a thin, papery texture and dark green colour, vary between 9in. and 15in. in length, and are divided into spreading pinnules (leafits) 3in. long: these are further cut into oblong segments, the lower ones of which are cut down so close to the stalk as to appear only as mere blunt lobes. The abundant sori (spore masses) are disposed in regular rows not reaching the edge.—*Hooker*, *Species Filicum*, iii., p. 225.

A. (Darea) scandens—Da′-rĕ-a; scan′-dens (climbing), *J. Smith.*

A very interesting and totally distinct, stove species, native of New Guinea and the Philippine Islands, with fronds 1ft. to 2ft. long, 6in. to 12in. broad, produced from a stout, short, and peculiarly woody, creeping rhizome. The numerous horizontal leaflets, 4in. to 6in. long and 1½in. broad, are cut down to a distinctly-winged stalk into numerous pinnules (leafits) that are divided to the rachis (stalk of the leafy portion) throughout the plant into narrow-linear divisions, each of which bears on its margin one solitary sorus (spore mass).—*Hooker*, *Species Filicum*, iii., p. 216. *Nicholson*, *Dictionary of Gardening*, iv., p. 496.

A. schizodon—schiz′-od-on (cut-toothed). Synonymous with *A. Vieillardii.*

A. (Diplazium) Schkuhrii—Dip-laz′-ĭ-um; Schkuhr′-ĭ-i (Schkuhr's), *Thwaites.*

A stove species, native of Ceylon, with fronds 1½ft. to 2ft. long, borne on naked stipites (stalks) 1ft. to 1½ft. long and of a peculiar grey-green colour. The leaflets, oblong-spear-shaped, cut into stalkless pinnules (leafits) that are divided again into shallow, close, blunt lobes, are of moderately firm texture and bright green colour. The sori (spore masses), about ⅛in. long, are disposed in a single row near the midvein of the pinnules. In general habit this species somewhat resembles a form of *A. crenulatum* of Baker. *A. Schkuhrii* of Hooker is synonymous with *A. japonicum.*—*Hooker*, *Synopsis Filicum*, p. 491. *Nicholson*, *Dictionary of Gardening*, i., p. 134. *Beddome*, *Ferns of Southern India*, t. 230.

A. (Euasplenium) scolopendrioides—Eu-as-ple′-nĭ-um; scol-op-en-drĭ-ŏ-i′-des (Scolopendrium-like), *J. Smith.*

A strange-looking, stove species, from the Philippines, with entire fronds of a somewhat leathery texture, spear-shaped, nearly 1ft. long, 1½in. broad, narrowed suddenly above to a long, tailed point, and very gradually into the stem below. The sori (spore masses) reach from the midrib to within ¼in. of the margin.—*Hooker*, *Species Filicum*, iii., p. 84.

A. (Euasplenium) Seelosii—Eu-as-ple′-nĭ-um; See-lo′-sĭ-i (Seelose's), *Leybold.*

This very curious and equally rare little species, although a native of cold parts of the Tyrol and Carinthia, requires, under artificial cultivation, the shelter of the greenhouse, or at least of the cold frame, to properly develop its singular little fronds. These are of a leathery texture and pale green colour, seldom more than ¾in. long, hairy, borne on slender, wiry stalks 1in. to 2in. long, and palmately cleft, usually into three nearly equal forks, and the edge of which is slightly toothed. The abundant sori (spore masses) occupy, when mature, the whole surface of the fronds.—*Hooker*, *Species Filicum*, iii., p. 175. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

This little species is somewhat difficult to manage: it should be firmly potted between pieces of sandstone, in loam, leaf-mould, rock-chippings, and sand, with good drainage.

A. (Diplazium) Seemannii—Dip-laz′-ĭ-um; See-man′-nĭ-i (Seemann's), *Baker.*

A stove species, from Darien, with spear-shaped fronds 9in. to 15in. long, 4in. broad, and furnished with twelve to twenty pairs of horizontal leaflets of a texture and pellucid venation similar to those of *A. grandifolium*, but with the sori (spore masses) extending from the midrib quite to the edge.—*Hooker*, *Synopsis Filicum*, p. 231.

A. (Euasplenium) septentrionale—Eu-as-ple′-nĭ-um; sep-ten-trĭ-o-na′-lĕ (Northern), *Hoffmann.*

This species, popularly known as the Forked Spleenwort, is of a very cosmopolitan character, for, according to Beddome, it is found abundantly in

Northern India, growing in Cashmere at 9,000ft., and in Gurhwal at 11,000ft., elevation; it is also a native of the Rocky Mountains and Mexico, while in Europe it is found in Norway, Sweden, and Denmark, as well as in France, Germany, Russia, Spain, and Italy. It is, however, as a British plant that it possesses the greatest interest, for it is a pretty, yet curious-looking, very local species, growing in the crevices of rocks or in the interstices of loose stone walls, and is by no means common in any part of the British Islands. Its specific name is, no doubt, an indication of its being most frequently found in the northern districts of Great Britain, where it is now considered a very rare Fern. Such, however, was not the case a quarter of a century ago, for although its home then was limited to the extreme northern and western districts of this country (whence it has been nearly eradicated by enthusiastic Fern-gatherers and tourists), yet wherever it did grow, there it was pretty abundant. The places where the Forked Spleenwort is now commonly found growing wild are Craig Dhu, Carnedd Llewellyn, and Snowdon, in Wales; Ingleborough, in Yorkshire; and Patterdale, Keswick, and above Ambleside, in Westmoreland; and it is also to be found in Forfarshire, Roxburghshire, Perthshire, and on the rocks on the southern side of Blackford Hill, near Edinburgh.

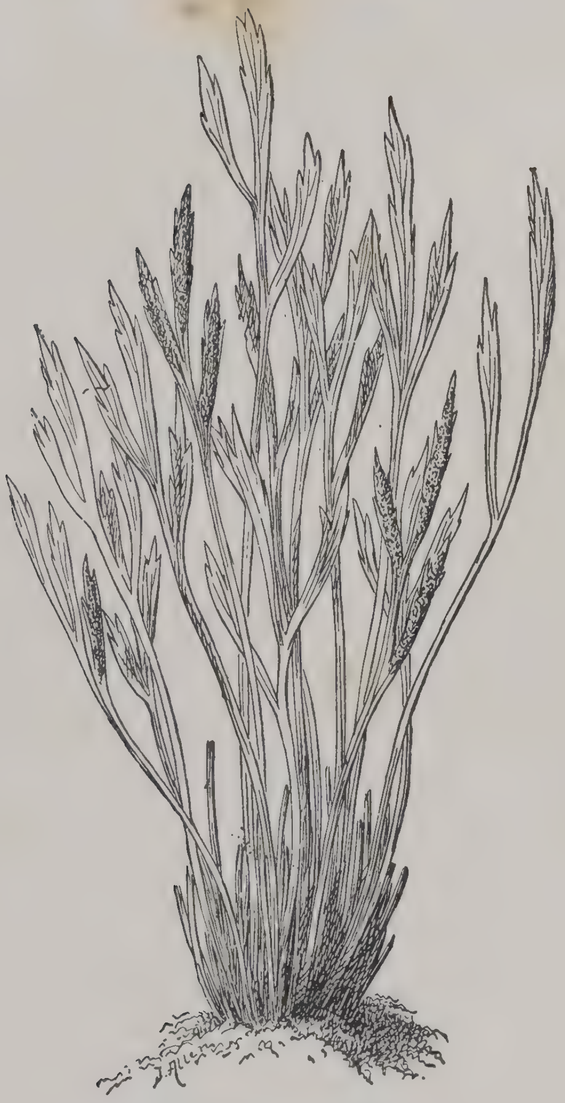


Fig. 126. Asplenium septentrionale
(⅔ nat. size).

This singular Fern was first noticed by Gerarde, who mistook it for a moss, calling it *Muscus corniculatus*, Horned or Knagged Moss. The drawing he published of it, however, corresponds exactly with our *A. septentrionale*. Parkinson recognises it as a Fern, and describes it as the Naked Stone Fern, *Filix saxatilis Tragi*. Ray writes of it also under the same Latin name, but calls it the Horned or Forked Maidenhair.

A. septentrionale is of particularly small dimensions, its fronds seldom attaining more than 2in. in length; they are of erect habit, somewhat stiff in texture, of a bright green colour, and are borne on slender, erect, naked stalks 3in. to 4in. long: they are either simple or cleft from the summit into two or three wedge-shaped divisions with a few sharp lateral and terminal teeth (Fig. 126). The copious and elongated sori (spore masses) often hide the whole under-surface of the fronds when mature.—*Hooker*, *Species Filicum*, iii., p. 174. *Nicholson*, *Dictionary of Gardening*, i., p. 134. *Eaton*, *Ferns of North America*, i., t. 15. *Lowe*, *Ferns British and Exotic*, v., t. 3A; *Our Native Ferns*, ii., t. 41B.

As is the case with all other species of delicate constitution and slow growth, it is necessary that the tufted crowns of the Forked Spleenwort should be kept above the surface of the soil, and in potting it the essential point is to secure perfect drainage. Use a mixture of peat, loam, and old mortar, in about equal parts. Water sparingly, taking care to avoid any superfluous moisture. The cold frame, where it may be equally sheltered from the frost and protected from the direct rays of the sun, is the best place in which to keep the plant in good order. *A. septentrionale* is not given to producing varieties.

A. (Euasplenium) serra — Eu-as-ple′-nĭ-um; ser′-ra (saw-edged), *Langsdorff and Fischer.*

This strikingly-beautiful, stove species, native of Brazil and Peru, also found on the Cameroon Mountains and at Fernando Po, is remarkable for the great size of its fronds, which frequently attain 4ft. in length and 1ft. in breadth, for their vivid green colour, for their prominent fructification, and for their elegantly-arching nature. These fronds, which rise from a stout, creeping rhizome, are furnished with fifteen to twenty pairs of spreading leaflets 4in. to 8in. long, about 1in. broad, sharply toothed on their edges, rounded at their base on the upper side, and wedge-shaped on the lower side. The sori are disposed mostly in two parallel rows close to the midrib.—*Hooker*, *Species Filicum*, iii., p. 154. *Lowe*, *Ferns British and Exotic*, v., t. 8.

A. (Diplazium) Shepherdii—Dip-laz′-ĭ-um; Shep-herd′-ĭ-i (Shepherd's), *Sprengel.*

A very distinct, stove species, native of Mexico, Peru, and Brazil, with fronds 1ft. to 1½ft. long, 6in. to 9in. broad, borne on erect, greenish stalks

1ft. long, and furnished with numerous leaflets of a thin, papery texture and light green colour. These leaflets are 4in. to 6in. long and 1in. to 1½in. broad, terminating in a sharp point, with the edge lobed and somewhat toothed. *A. ambiguum* is synonymous with this species.—*Hooker*, *Species Filicum*, iii., p. 245. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. S. inæquilaterum—in-æ-quil-at′-er-um (unequal-sided), *Mettenius*.

This variety differs from the preceding species by the firm texture and the dull colour of its fronds, also by their leaflets being provided with deeper and more uniform lobes, somewhat sickle-shaped, with their two sides unequal, the lower one being unequally truncate at the base.—*Hooker*, *Synopsis Filicum*, p. 233. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. Shuttleworthianum — Shut-tle-worth-ĭ-a′-num (Shuttleworth's). A form of *A. bulbiferum*.

A. (Thamnopteris) Simonsianum—Tham-nop′-ter-is ; Sim-ons-ĭ-a′-num (Simons's), *Hooker*.

A stove species, with entire (undivided) fronds of a leathery texture, 1ft. to 1½ft. long, 1½in. broad, tapering above into a sharp point and very gradually below into a short stem ; the midrib, flat on the upper surface, is rounded and prominent below. The abundant sori (spore masses) reach from the midrib to within a short distance of the edge. This species is a native of Southern India, and is found in Khasia and on the Unker Hills.—*Hooker*, *Species Filicum*, iii., p. 81. *Beddome*, *Ferns of British India*, t. 248.

A. (Euasplenium) simplicifrons—Eu-as-ple′-nĭ-um ; sim-plic′-if-rons (with simple fronds), *F. Mueller*.

A greenhouse species, native of Bockingham Bay, Australia. Its fronds are entire, somewhat leathery in texture, 1ft. to 1½ft. long, ¾in. broad, narrowed gradually towards both ends, and have their edge entire or slightly undulated. The sori (spore masses) fall short of both midrib and edge.—*Hooker*, *Synopsis Filicum*, p. 193.

A. (Athyrium) Skinneri—Ath-yr′-ĭ-um ; Skin′-ner-i (Skinner's), *Baker*.

A stove species, native of Guatemala, much resembling the Mexican *A. achilleæfolium*, but with pinnæ and pinnules (leaflets and leafits) less deeply cut, and the latter so broad that they are often overlapping.—*Hooker, Synopsis Filicum*, p. 226.

A. (Anisogonium) Smithianum—An-is-og-o′-nĭ-um ; Smith-ĭ-a′-num (Smith's), *Baker.*

A stove species, native of Ceylon, and one very closely related to *A. latifolium*, from which it differs only through its anastomosing (intermixed) venation and the roughness of its stalks.—*Hooker, Synopsis Filicum*, p. 244.

A. spathulinum — spath-ul-i′-num (spoon-shaped). Synonymous with *A. affine.*

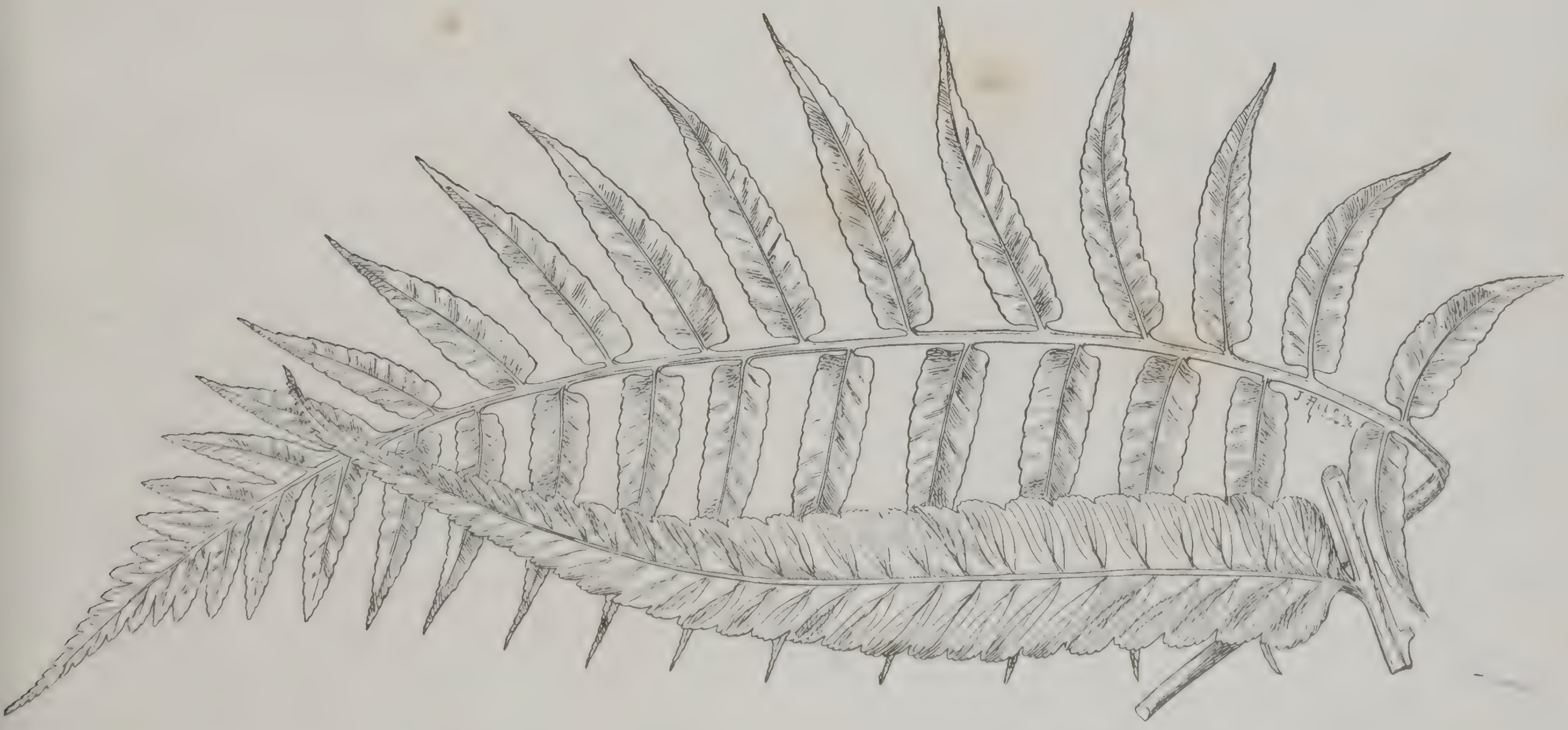


Fig. 127. Entire Frond and Pinna of Asplenium speciosum
(Frond, ⅓ nat. size ; Pinna, nat. size).

A. (Diplazium) speciosum — Dip-laz′-ĭ-um ; spec-ĭ-o′-sum (showy), *Mettenius.*

A stove species, of bold appearance, native of the Philippine and Malayan Islands, Java, and Hong-Kong, with fronds 1ft. to 2ft. long, 8in. to 12in. broad, borne on straw-coloured, erect stalks 1ft. or more long, and produced from a wide-creeping rhizome. The leaflets, of a thin but firm texture, 4in. to 6in. long and ¾in. to 1in. broad, have their edge conspicuously lobed and slightly toothed, and their base somewhat wedge-shaped (Fig. 127). The slender sori (spore masses) reach nearly to the edge.—*Hooker*, *Synopsis Filicum*, p. 235. *Beddome*, *Ferns of British India*, t. 290.

A. (Athyrium) spinulosum—Ath-yr′-ĭ-um ; spi-nul-o′-sum (slightly spiny), *Baker.*

This greenhouse species, native of Amurland, has fronds deltoid (in shape of the Greek delta, Δ), 9in. to 12in. each way, borne on firm, erect, straw-coloured stalks 6in. to 12in. long and more or less clothed throughout with spear-shaped scales of a pale brown colour. These fronds, tri- or quadri-pinnatifid (three or four times divided nearly to the midrib), are provided with nine to twelve pairs of leaflets of a thin, papery texture, the lowest much the largest : all are spear-shaped and cut down into oblong, sharp-pointed segments, which are sharply toothed. The sori (spore masses) are usually round and covered with an egg-shaped involucre, and are disposed from two to ten to a segment.—*Hooker*, *Synopsis Filicum*, p. 225. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. (Euasplenium) splendens—Eu-as-ple′-nĭ-um ; splen′-dens (splendid), *Kunze.*

A very rare, greenhouse species, native of Cape Colony. Its fronds, 6in. to 12in. long, are borne on greenish stalks 6in. to 9in. long, furnished with a few scales below ; they are bi- or tripinnate (twice or three times divided to the midrib), the lower leaflets especially being cut into wedge-shaped segments that are slightly lobed and sharply toothed round their outer edge. The copious sori (spore masses), slender and irregular in shape, reach nearly from the base to the tip of the segments.—*Hooker*, *Species Filicum*, iii., p. 168. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. (Diplazium) Sprucei—Dip-laz′-ĭ-um ; Spru′-cĕ-i (Spruce's), *Baker.*

A well-marked and distinct, stove species, native of the Andes of Ecuador, and one which, from the very dark green colour of its fronds and their papery texture, evidently grows in very damp places. Its fronds, 9in. to 15in. long, 1in. to 3in. broad, and borne on firm, erect stalks 6in. to 9in. long, of a dark brown colour, are furnished with fifteen to twenty pairs of spreading leaflets, with the point somewhat blunt, the edge lobed in the lower part half-way down to the stalk, and the base narrowed suddenly on both sides. The sori (spore masses) reach from the midrib nearly to the edge.—*Hooker*, *Synopsis Filicum*, p. 234.

A. (Euasplenium) stenophyllum—Eu-as-ple′-nĭ-um ; sten-oph-yl′-lum (narrow-leaved), *Beddome.*

A greenhouse species, native of the Himalayas, where it is found growing at an elevation of 6000ft. It is allied to *A. ensiforme* of Wallich, but has very narrow, simple fronds like those of a Vittaria, of a leathery texture, 1¼ft. to 1½ft. long, barely ½in. broad, of a drooping habit, perfectly smooth, gradually attenuated into short stalks furnished with long and narrow, black, smooth scales, like those with which the creeping rhizome (prostrate stem), from which they are produced, is densely clothed. The sori (spore masses) are broad, and reach nearly to both midrib and margin.—*Beddome*, *Ferns of British India*, t. 147.

A. subsinuatum—sub-sin-u-a′-tum (somewhat wavy). Synonymous with *A. lanceum.*

A. sundense—sund-en′-sĕ (Soudanese). A synonym of *A. vittæforme.*

A. (Diplazium) sylvaticum—Dip-laz′-ĭ-um ; syl-va′-tic-um (from the woods), *Presl.*

This is a distinct, stove species, native of the Mauritius, Java, Borneo, and the Neilgherries, where, according to Beddome, it is abundant down the Sisparah Ghat. Its fronds, 1ft. to 2ft. long, 4in. to 8in. broad, and somewhat spear-shaped, are borne on firm, erect, brownish stalks 1ft. long, scaly at the base, and produced from a decumbent rhizome. They are furnished with numerous spreading leaflets of a thin, papery texture, 3in. to 4in. long, sharply pointed, with the edge broadly lobed and narrowed suddenly on both sides at the base. The sori (spore masses) are disposed in long, slender lines reaching nearly to the edge.—*Hooker*, *Species Filicum*, iii., p. 248. *Beddome*, *Ferns of Southern India*, t. 161. *Nicholson*, *Dictionary of Gardening*, i., p. 134.

A. tenellum—ten-el′-lum (delicate). This is identical with *A. lunulatum reclinatum.*

A. (Euasplenium) tenuifolium — Eu-as-ple′-nĭ-um ; ten-ŭ-if-ol′-ĭ-um (small-leaved), *Don.*

A pretty, greenhouse species, native of the Himalayas and the Neilgherries, and, according to Beddome, common in Sholas on the banks of streams at Ootacamund and at the Avalanche Bungalow on the Anamallay Mountains. Its oblong-spear-shaped fronds, 6in. to 12in. long, 3in. to 5in. broad, and borne on slender, naked stalks 3in. to 6in. long, are furnished with numerous leaflets of a thin, papery texture, divided into pinnules (leafits) which in their turn are cut down to a narrowly-winged stalk into spoon-shaped segments sharply cleft on the outer edge. The sori (spore masses) are disposed one or two to each segment and placed on each side of the midvein.—*Hooker, Species Filicum*, iii., p. 193. *Beddome, Ferns of Southern India*, t. 130.

A. (Athyrium) thelypteroides — Ath-yr′-ĭ-um ; the-lyp-ter-ŏ-i′-des (Thelypteris-like), *Michaux.*

This handsome, greenhouse species, which is easily distinguished by its long sori (spore masses) disposed in regular rows, is a native of Sikkim and the Himalayas, where it is found up to 10,000ft. elevation. It also grows in a wild state in North America, where, according to Eaton, it is one of the most conspicuous Ferns in the forests of the Northern States, and is most frequently found where a rivulet trickles through deep forests on the lower slopes of a mountain, keeping the earth at all times moist. It occurs principally in such positions from North Brunswick and Canada to Central Alabama and westward to Wisconsin. Its fronds, 1ft. to 2ft. long and 6in. to 12in. broad, are spear-shaped and borne on upright stalks, 6in. long, that are chaffy when very young but nearly smooth when mature (the stalk shown in Fig. 128 is rather shorter than usual). The numerous spreading leaflets are 4in. to 6in. long, and are cut down to a broadly-winged stalk into small pinnules (leafits) of a thin, papery texture. The oblong sori are disposed in close, regular rows reaching nearly from the midrib to the edge, slightly curved, the lower ones often double.—*Hooker, Species Filicum*, iii., p. 226. *Eaton, Ferns of North America*, ii., t. 50. *Beddome, Ferns of British India*, t. 68.

A. (Darea (Thunbergii—Da′-rĕ-a ; Thun-berg′-ĭ-i (Thunberg's). This is synonymous with *A. auriculatum.*

A. (Diplazium) Thwaitesii—Dip-laz′-ĭ-um ; Thwaites′-ĭ-i (Thwaites's), *Hooker.*

This very fine, stove species, native of Ceylon, appears to be intermediate between the popular *A. japonicum* and *A. decussatum.* Its fronds, 1ft. long, 4in. broad, and borne on slender, green stalks 6in. long and densely clothed with strong, white, woolly hairs, are produced from a wide-creeping rhizome. They are furnished with eight to ten pairs of distant leaflets besides the terminal one, which is only pinnatifid (cut half-way down to the midrib). The largest of these leaflets, 2in. long and ½in. broad, are cut down two-thirds of the way to the stalk into notched lobes about ¼in. deep ; they are of a soft, papery texture, pale green in colour, and hairy on both surfaces. The sori (spore masses) reach half-way to the edge.—*Hooker, Species Filicum,* iii., p. 250. *Nicholson, Dictionary of Gardening,* i., p. 134. *Beddome, Ferns of British India,* t. 291.

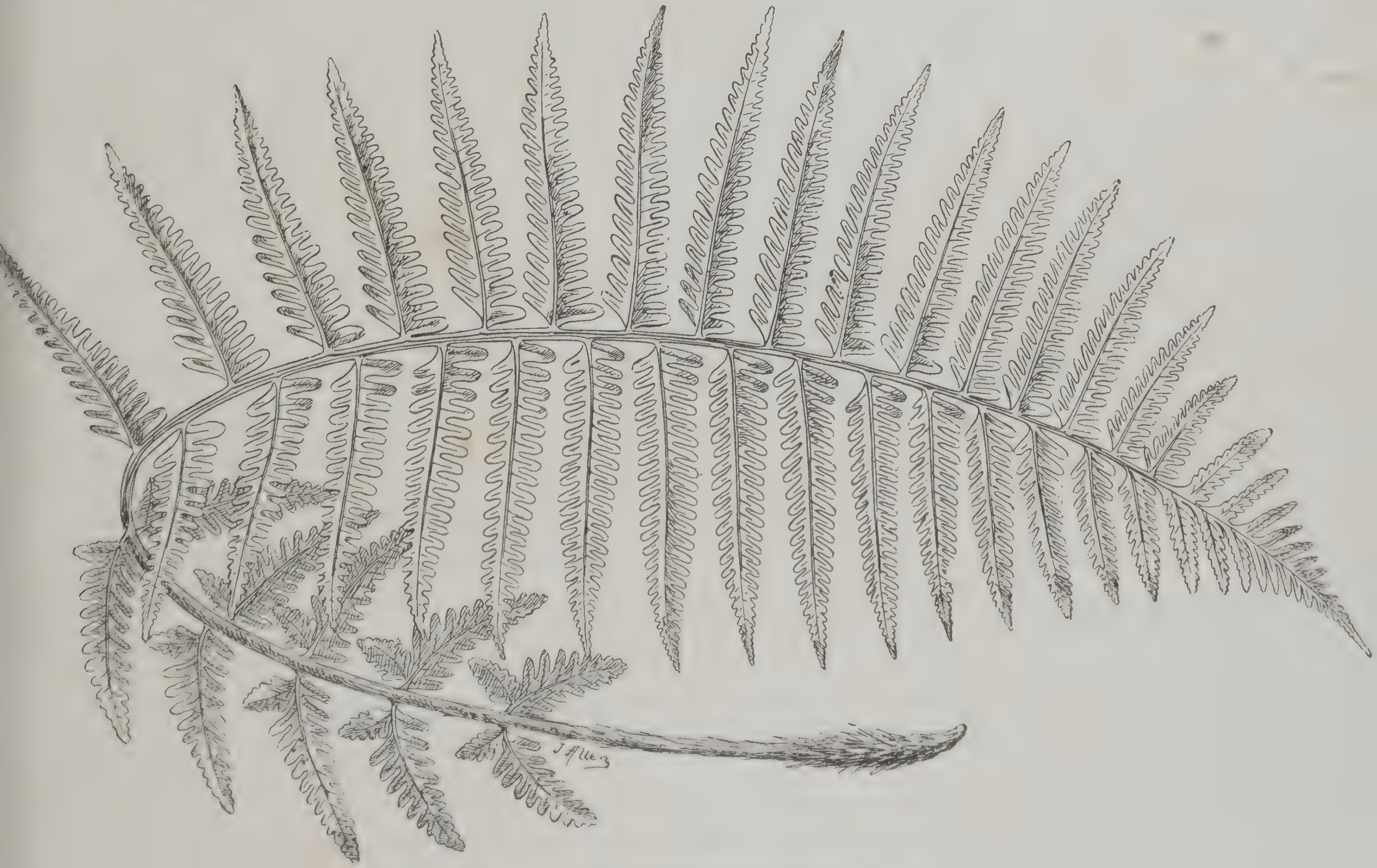


Fig. 128. Frond of Asplenium thelypteroides

(½ nat. size).

A. (Euasplenium) Trichomanes—Eu-as-ple′-nĭ-um ; Trich-om′-an-ēs (Maidenhair Spleenwort), *Linnæus.*

This pretty, dwarf species is of all known Ferns the one which perhaps possesses the most cosmopolitan character, for its geographical distribution is so great that, besides being found throughout Europe, it is, according to Beddome, very common in most parts of India, especially at Kallutty, on the Neilgherries, where it grows in abundance at elevations of 5000ft. or 6000ft. On the other hand, Eaton, in his excellent work on "Ferns of North America," says that it is common in North America from Canada to British Columbia, and throughout the United States to Alabama, Texas, Colorado, California, and Oregon, where it grows in crevices of shady rocks and also sometimes on old walls. It is found wild in nearly every part of England, being rarest in the Eastern Counties and most abundant in the Western ones, where it is so generally distributed that it is needless to enumerate the localities. It is usually found from the sea-level up to 2000ft., and its favourite habitats are ruins, rocks, and old walls, though it is frequently met with on hedge-banks. The shady side of an old wall is undoubtedly the situation the Maidenhair Spleenwort prefers, and that in which it is most commonly found ; but once, in the eastern part of France, we came across a very long and very high wall facing due south that was literally covered and completely hidden by this pretty species, which formed a perfectly dense and most lovely green carpet. Yet, although many hours were spent in close examination of these plants, we were unable to discover among them any deviation from the type. All the specimens were alike in appearance and in growth, which was unusually long for plants exposed to the full action of the sun. This, no doubt, was attributable to the fact that the wall on which the Ferns grew measured over 3ft. in thickness and was a remnant of fortifications, with abundance of soil at the back, so that a great quantity of moisture was always present.

The Maidenhair Spleenwort was known as one of our native plants to the earliest of our herbalists, for in the "Seconde Parte of William Turner's Herball," published in 1568, he calls it "English Mayden's Heare," and the woodcut leaves no doubt that the plant referred to was our *A. Trichomanes.* Gerarde is the first English writer who mentions any place in England where it was native. He says : "I found it growing in a shadowy, sandy lane in

Betsome, in the parish of Southfleet, in Kent. It groweth likewise upon stone walls at Her Majesty's (Queen Elizabeth's) Palace of Richmond, and on most stone walls of the west and north parts of England."

According to the situation which *A. Trichomanes* occupies, its fronds, linear (long and narrow) and only once divided to the midrib (Fig. 129), vary from 6in. to 12in. in length; they are borne on slender, glossy stalks 2in. to 4in. long and of a peculiar chestnut-brown colour, and are furnished with from fifteen to thirty pairs of dark green leaflets, scarcely stalked and of a somewhat leathery texture. These are usually roundish-oblong, obliquely wedge-shaped at the base, and toothed all round, yet variable in form. The fructification is distributed over the frond, and the sori (spore masses), disposed in linear, oblique lines of three to six on each side of the midrib, become confluent when fully developed and entirely cover the under-side of the leaflets.—*Hooker*, *Species Filicum*, iii., p. 136. *Beddome*, *Ferns of Southern India*, t. 147. *Eaton*, *Ferns of North America*, i., t. 36. *Lowe*, *Ferns British and Exotic*, v., t. 22; *Our Native Ferns*, ii., t. 46.

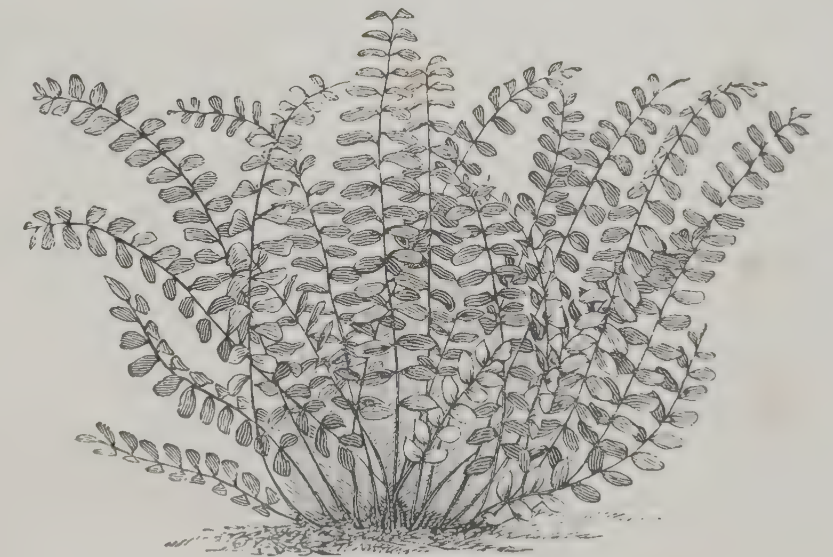


Fig. 129. Asplenium Trichomanes
(⅙ nat. size).

The Maidenhair Spleenwort may be propagated either by means of its spores, which are generally ripe in August and germinate freely, or, as is most commonly the case, by the division of its crowns. In the latter case it is best to select, as far as practicable, plants growing on hedge-banks, as it is somewhat difficult to safely remove those which grow amongst bricks and stones, and the operation, to be successful, should be performed during March and April. Hardy as it is, the Maidenhair Spleenwort prefers an exposed situation to a close or very shady one, in which the constant moisture, by collecting on the fronds, soon causes them to blacken and decay. If the plants are grown in pots it is essential that these should be well drained, and frequent watering over the fronds must be avoided. The compost best suited for this species is a mixture of porous, loamy soil, lumps of sandstone, and old lime rubbish. *A. Trichomanes* is particularly adapted for the formation, in the hardy outdoor Fernery, of a neat and pleasant edging where it can take its natural position; but in this case it should be planted between stones, and the crowns should be kept slightly above the surface of the soil. It is in such a position that its graceful, slender fronds are shown to perfection.

The Maidenhair Spleenwort has produced several very interesting and pretty varieties, some of which are more or less crested, forked, or branched, while others differ from the typical species by having their pinnæ (leaflets) variously cut or disposed in different ways. Amongst the former section, all of which are of about normal dimensions, the most distinct are:

A. T. acrocladon—ac-roc′-lad-on (branched at the summit), *Lowe.*

A distinct variety, originally found in Owsnip Gill, Swaledale, Yorkshire, and having fronds repeatedly branched at their apex.—*Lowe, Our Native Ferns*, ii., p. 204, fig. 553.

A. T. biceps—bic′-eps (two-headed), *Lowe.*

A variety artificially raised from spores by Mr. Mapplebeck, late of Woodfield, Moseley, near Birmingham, and said to be quite constant.—*Lowe, Our Native Ferns*, ii., p. 210, fig. 566.

A. T. bifurcum—bif-ur′-cum (twice-forked), *Wollaston.*

Originally found near Maidstone, and subsequently on the wall of Hoddam Kirkyard, in Dumfries-shire, and in Owsnip Gill, Swaledale.—*Lowe, Our Native Ferns*, ii., p. 203, fig. 550.

A. T. cornuto-ramosum—cor-nu′-to–ra-mo′-sum (having horn-like branches), *Lowe.*

A singular variety, originally found near the Clifton Suspension Bridge, and distinct from all other known forms by the presence of a cornute (horn-like) projection disposed in the centre of the forking of the fronds, which are regularly divided into two branches.—*Lowe, Our Native Ferns*, ii., p. 209, fig. 563.

A. T. corymbiferum—cor-ymb-if′-er-um (corymb-bearing), *Lowe.*

A normal and coarsely-crenated form, with a large branching tuft at the end of each frond. Originally found at Owsnip Gill, in Swaledale.—*Lowe, Our Native Ferns*, ii., p. 205, fig. 554.

A. T. cristatum—cris-ta′-tum (crested), *Wollaston.*

This pretty, crested variety (Fig. 130), of vigorous growth and freely reproduced by spores, was first noticed and distributed by Mrs. Delves, of Tunbridge Wells, who found it growing in a mass of *Hymenophyllum unilaterale* (*Wilsoni*) which she had received from the Glasgow Botanic Gardens.—*Lowe, Our Native Ferns*, ii., p. 208, fig. 561.

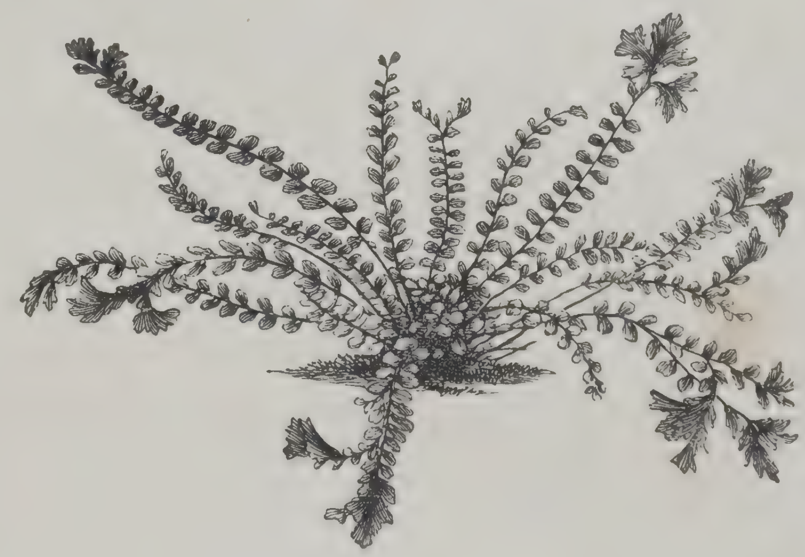


Fig. 130. Asplenium Trichomanes cristatum
(¼ nat. size).

A. T. multifidum — mul-tif′-id-um (much-cleft), *Moore.*

This is another free-growing, crested form reproducing itself freely from spores, and indigenous in Scotland, as it was originally found growing wild at St. Mary's Isle, Kirkcudbright, and distributed by the late Mr. J. McNab, of the Edinburgh Botanic Gardens. It has, however, been since found wild near Capel Curig, in North Wales.—*Lowe, Our Native Ferns*, ii., p. 208, fig. 562.

A. T. ramo-depauperatum—ra′-mo–de-pau-per-a′-tum (having impoverished branches), *Clapham.*

A pretty variety, with impoverished fronds terminating in a tuft of from six to twelve most depauperated branchlets. It was raised from spores by Mrs. A. Clapham, of Scarborough.—*Lowe, Our Native Ferns*, ii., p. 210, fig. 565.

A. T. ramo-lobatum—ra′-mo–lob-a′-tum (having branched lobes), *Moore.*

A large-growing form, with the lobes of the leaflets deeply cut and coarsely toothed on their margin. Originally found near Nettlecombe.—*Lowe, Our Native Ferns*, ii., p. 213, fig. 573.

A. T. ramosum—ra-mo′-sum (branched), *Wollaston.*

This much-branched variety, with the stalks twice or three times forked and the terminal lobes often enlarged and multifid (much-cleft), was originally found at Newte's Hill, near Tiverton, and somewhat abundantly near Ilfracombe, in Devonshire, and subsequently on Quin Abbey, County Clare; near Windermere, near Keswick, and in Owsnip Gill, in Swaledale, Yorkshire.—*Lowe*, *Our Native Ferns*, ii., p. 202, fig. 549.

The foregoing are all crested, branched, or forked forms, and, with the exception of *A. T. cristatum* and *A. T. ramosum*, which reproduce themselves freely from spores, they can only be increased by the division of the crowns. Of the non-crested forms of *A. Trichomanes*, some are really very pretty and interesting: the following are among the most distinct:

A. T. confluens—con′-flŭ-ens (joining), *Moore.*

This strikingly-distinct form, of somewhat smaller dimensions than the typical plant, is remarkable for its crowded, overlapping leaflets and the conspicuously-confluent extremity of its fronds, seldom more than 3in. long. It was originally found at Levens, Milnthorp.—*Lowe*, *Our Native Ferns*, ii., p. 207, fig. 560.

A. T. imbricatum—im-bric-a′-tum (overlapping), *Clapham.*

A curious and very pretty variety, of particularly dwarf habit, its fronds seldom exceeding 3in. in length. The leaflets are distinctly but minutely stalked, their edges are prettily toothed, and they are disposed so close together as to overlap each other. It was originally discovered at Knaresborough, Yorkshire, and has not been found in any other locality.—*Lowe*, *Our Native Ferns*, ii., p. 212, fig. 570.

A. T. incisum—in-ci′-sum (cut), *Moore.*

This, the most beautiful form of the Maidenhair Spleenwort and a perfect little gem in itself, has been found wild in various localities far apart from one another. It was originally discovered in Devonshire, then at Kent Clough, near Burley, Lancashire; in Burrowdale, Cumberland; in Jersey; in County Clare, Ireland; and near Pyle, in Glamorganshire. The most singular statement on record respecting this pretty little Fern, however, comes from

Eaton, who, in his excellent work, "Ferns of North America," says that, besides having been found near Brattleboro, Vermont, it is frequently collected near San Diego, California, where the typical plant does not seem to occur. Its somewhat triangular and generally sharp-pointed leaflets are deeply cleft into narrow-oblong, irregularly and profoundly serrated segments, the larger of them often being lobed. See Fig. 131.—*Lowe, Our Native Ferns*, ii., p. 201, fig. 548. *Eaton, Ferns of North America*, i., t. 36.

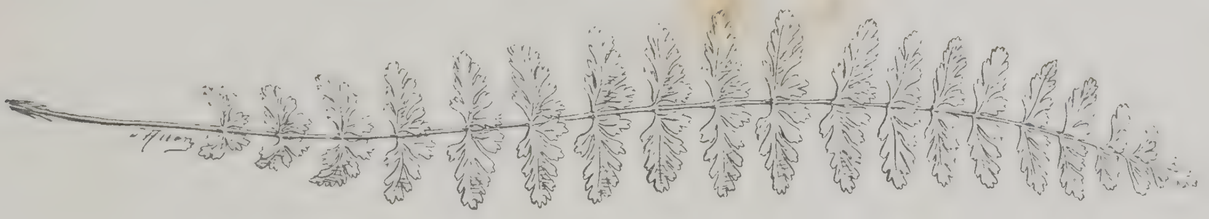


Fig. 131. Frond of Asplenium Trichomanes incisum
(½ nat. size).

A. T. i. Claphami—Clap′-ham-i (Clapham's), *Lowe.*

Undoubtedly the finest form of the variety *incisum.* Its fronds are 6in. to 7in. long and are furnished with upwards of thirty pairs of leaflets, which sometimes measure ¾in. in length and ¾in. across the base, the basal lobes right and left being cut down nearly to the midrib and themselves again lobed and having segments toothed and more or less deeply cleft. Unfortunately, this lovely form, which was originally found at Smeerset, near Settle, Yorkshire, is entirely barren, and consequently very scarce.—*Lowe, Our Native Ferns*, ii., p. 212, fig. 572.

A. T. i. laciniatum—lac-in-ĭ-a′-tum (torn), *Moore.*

A distinct sub-variety, of small dimensions, originally found in County Clare, Ireland. Its fronds, seldom more than 3in. long, have their leaflets narrow and finely laciniated.—*Lowe, Our Native Ferns*, ii., p. 206, fig. 557.

A. T. lobatum—lob-a′-tum (lobed), *Moore.*

In this large-growing variety, originally found at Shaw Bridge, in Devonshire, the fronds, upwards of 1ft. in length, have their leaflets, especially in the centre of the frond, deeply divided at their base into two broadly egg-shaped lobes, the lowest one sometimes separated almost to the midrib. —*Lowe, Our Native Ferns*, ii., p. 206, fig. 558.

A. T. majus—ma′-jus (greater).

A garden name for a very strong-growing form, found in Devonshire, County Clare, and other places. It is of normal form, and its only difference from the typical plant lies in the great size of its fronds, which measure from 1ft. to 1½ft. in length.—*Lowe, Our Native Ferns*, ii., p. 214.

A. T. serratum major—ser-ra′-tum ma′-jor (greater saw-edged), *Lowe.*

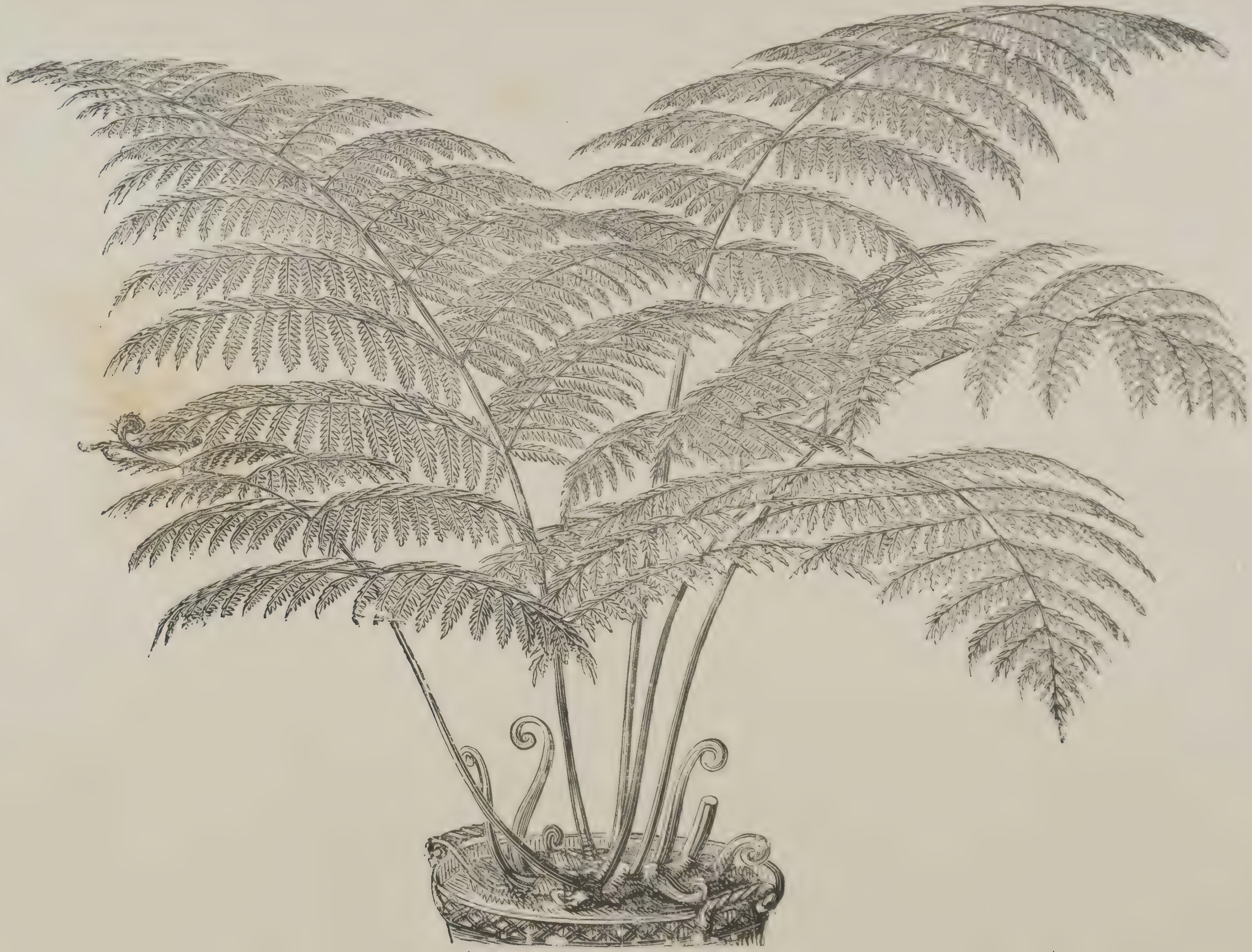
This variety, originally found at Shaw Bridge, in Devonshire, differs from the typical species by the length of its fronds, which are frequently 1ft. long and 1¼in. broad, and from the foregoing variety by its loose and unusually large leaflets being coarsely toothed and occasionally dilated and forked at the extreme tip of the frond.—*Lowe, Our Native Ferns*, ii., p. 205, fig. 556.

A. T. subæquale—sub-æ-qua′-lĕ (nearly equal), *Moore.*

This is a handsome form, with fronds sometimes narrowed and elongated and with leaflets distinct, sometimes broad and shorter, with large, crowded leaflets. It was originally found on the banks of the Wye, and later on at Knaresborough, Yorkshire ; at Whitbarrow, in Westmoreland ; at Nettlecombe, Somerset ; and at or near Tunbridge Wells. This variety differs in a remarkable degree from all others in having the leaflets equal-sided at the base, the upper ones being oblong, the lower ones more frequently obtuse-deltoid (in form of the Greek delta, Δ, with a blunt point) ; their margins are sometimes slightly sinuated and form a gently-waving line, while at other times they are deeply dented and frequently even elegantly notched.—*Lowe, Our Native Ferns*, ii., p. 206, fig. 559.

A. (Euasplenium) trilobum—Eu-as-ple′-nĭ-um ; tril′-ob-um (three-lobed), *Cavanilles.*

A very rare little, stove species, native of Chili and South Brazil, with curious little fronds 1½in. long and 1in. broad, borne on firm, erect stalks 2in. to 3in. long and scaly below. These fronds are very singular in shape, being wedge-shaped at the base, entire, with their margin undulated and notched, on the lower part deeply lobed with broadly-notched divisions. They are of a leathery texture, and the sori (spore masses) are broad and short. —*Hooker, Species Filicum*, iii., p. 90. *Nicholson, Dictionary of Gardening*, i., p. 134.



Dicksonia davallioides Youngii

(⅙ nat. size).

A. (Athyrium) umbrosum—Ath-yr′-ĭ-um; um-bro′-sum (found in shady places), *J. Smith.*

This very handsome, greenhouse species, of large dimensions, which is also known as *A. Brownii* and *Allantodia australe*, has a very wide geographical distribution, for it is recorded as indigenous in Madeira, the Canaries, the Azores, Java, Ceylon, Australia, New Zealand, and Tasmania, while on the Himalayas it is found growing at various elevations from 6000ft. to 8000ft. Its fronds, from 3ft. to 5ft. long and 1ft. to 1½ft. broad, are borne on strong, erect stalks 1ft. or more long, of a brownish colour, and clothed below with dark scales. The pinnæ (leaflets), of a thin, papery texture and light green colour, are somewhat ovate (egg-shaped) and are divided into closely-set, spear-shaped pinnules (leafits); these leafits are again cut into numerous linear-oblong segments which are deeply cleft. The abundant sori (spore masses) are oblong in shape and closely set.—*Hooker, Species Filicum*, iii., p. 232. *Nicholson, Dictionary of Gardening*, i., p. 134. *Lowe, Ferns British and Exotic*, v., t. 41.

A. (Euasplenium) varians—var′-ĭ-ans (variable), *Hooker and Greville.*

A very variable and widely-distributed, greenhouse species, of small dimensions, native of the Himalayas, Ceylon, Cape Colony, and the Neilgherries, where, according to Beddome, it is very common about Ootocamund. Its fronds, 4in. to 6in. long, 1in. broad, and borne on slender, greenish stalks 1in. to 3in. long, are oblong-spear-shaped, and furnished with from eight to twelve pairs of leaflets of a soft, papery texture, mostly cut to the midrib into a few wedge-shaped pinnules (leafits) that are sharply toothed on the outer edge. The abundant sori (spore masses), when mature, cover nearly the whole under-surface of the pinnules. Fig. 132 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker, Species Filicum*, iii.,

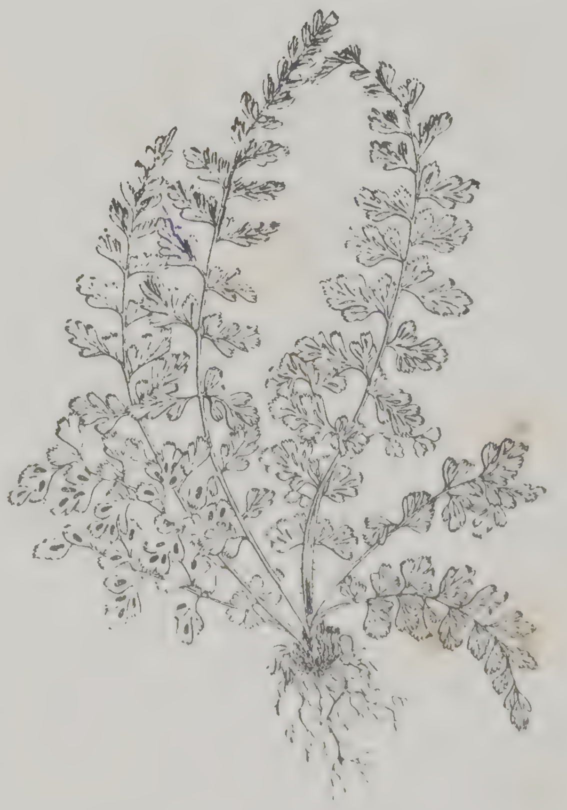


Fig. 132. Asplenium varians
(½ nat. size).

p. 192. *Nicholson, Dictionary of Gardening*, i., p. 134. *Beddome, Ferns of Southern India*, t. 129.

A. Veitchianum—Veitch-ĭ-a′-num (Veitch's). This is identical with *A. Belangeri.*

A. (Euasplenium) Vieillardii—Eu-as-ple′-nĭ-um ; Vieil-lard′-ĭ-i (Vieillard's), *Mettenius.*

A very graceful, greenhouse species, native of New Caledonia, with fronds 6in. to 9in. long, 6in. broad, formed of a large terminal leaflet lengthened out at the point and deeply toothed, and three or four pairs of similar lateral ones 4in. long and ½in. broad, of a thin, papery texture and dark green colour. The distantly-placed sori (spore masses) fall short of both edge and midrib. *A. schizodon* is another name for this species.—*Hooker, Synopsis Filicum*, p. 200. *Nicholson, Dictionary of Gardening*, i., p. 135.

A. V. apicidens—ap-ic′-id-ens (toothed at the apex). A variety of *A. Vieillardii*, with more obtuse venation and shortened sori.

A. (Euasplenium) viride—Eu-as-ple′-nĭ-um ; vir′-id-ĕ (green), *Hudson.*

This hardy species, which somewhat resembles *A. Trichomanes*, is a native of the whole of North and Central Europe, also of the Himalayas and Kumaon, where, according to Beddome, it is found at an elevation of 12,000ft. Eaton also tells us that it is found growing on shaded rocks from New Brunswick and Northern New England to the Rocky Mountains and British Columbia.

As a British species the Green Spleenwort is particularly interesting. Its light green colour, more especially in the case of the stalks, is a most distinguishing character in a plant which, as regards size and habit, is very similar to the Maidenhair Spleenwort (*A. Trichomanes*), from which it differs also by its less erect and more graceful habit. Like that species, it is particularly fond of moist rocks and old walls in cool districts, for, although it has been gathered in Northumberland ; on the Mazebeck Scars, in Westmoreland ; at Gordale, Settle, near Halifax, and at Black Bank, near Leeds, in Yorkshire, it has not been found in England further south than Derbyshire. The principal places where the Green Spleenwort has been found in Ireland are on Turk Mountain, Killarney ; on Ben Bulben, Sligo ;

and near Lough Eske, on the Donegal Mountains. It has also been gathered on Cader Idris, Crib-y-Ddeseil, and Snowdon, in Wales; and in Ross-shire, in Cawdor Woods, near Nairn; at the foot of Benmore, Sutherlandshire, and all over the Highlands. Fine masses of this species, with fronds upwards of 6in. long, are said to have been gathered in Perthshire by Mr. B. S. Williams,

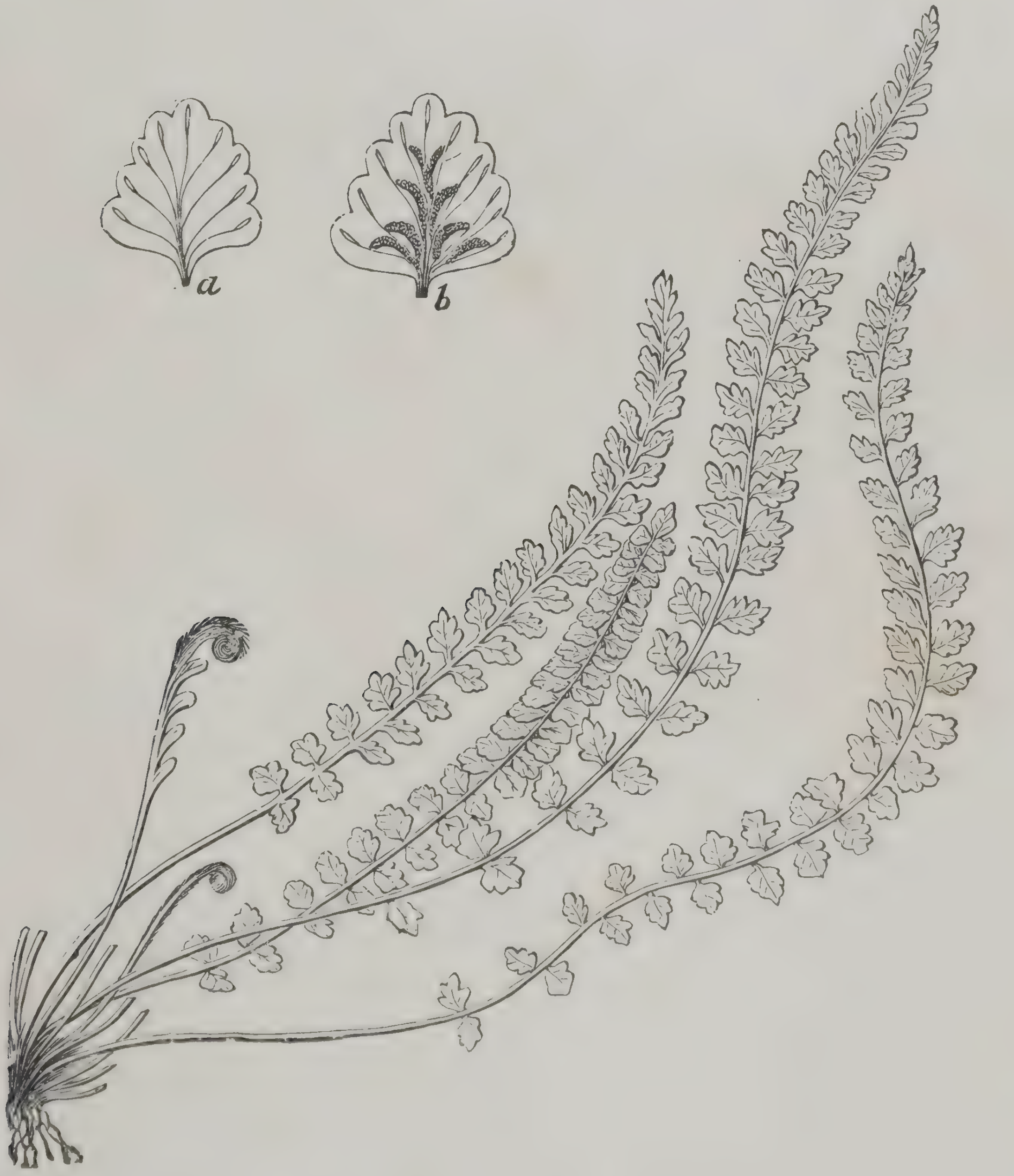


Fig. 133. Asplenium viride, showing Habit, and (a) Barren and (b) Fertile Pinnæ
(Habit, nat. size; Pinnæ, enlarged)

but this is a size very unusual with the plant, whose fronds generally average about 4in. in length. Removal from its natural nooks is generally attended with some difficulty, but when once it is established it succeeds very well under the treatment recommended for the Maidenhair Spleenwort (*A. Trichomanes*).

The first botanist recognising the Green Spleenwort as a distinct species was Cordus, who, in 1561, published it in his "Historia Stirpium" under the name of *Adiantum album*, though he gives the same woodcut of it as he does for *Asplenium Trichomanes.* The first to name it *Asplenium viride* was, we believe, Hudson, in his "Flora Anglica," published during 1762.

A. viride has narrow-linear fronds 4in. to 6in. long and less than ½in. broad, borne on very short, green, slender stalks, and furnished with twenty to thirty pairs of stalkless leaflets (Fig. 133) less than ½in. each way; these leaflets are cuneate-flabellate (wedge- and fan-shaped), the upper edge is suddenly narrowed at the base, the lower one is obliquely truncate (broken off), and the outer part is deeply notched. The abundant sori (spore masses) are linear-oblong in shape and are disposed in an oblique position.—*Hooker, Species Filicum*, iii., p. 144. *Lowe, Our Native Ferns*, ii., t. 47; *Ferns British and Exotic*, v., t. 28. *Eaton, Ferns of North America*, i., t. 36. *Beddome, Ferns of British India*, t. 64.

Several variations are described and figured by Lowe in "Our Native Ferns," but it is very questionable whether any of these can now be found in any collection or procured anywhere, and the form *multifidum*, which is frequently found amongst plants of the typical species and which has fronds more or less forked at their extremity, can scarcely be termed a permanent variety.

A. (Euasplenium) vittæforme — Eu-as-ple′-nĭ-um; vit-tæ-for′-mĕ (ribbon-fronded), *Cavanilles.*

A singular and pretty, stove species, native of Java and the Philippine and Fiji Islands, with leathery, entire (undivided), spear-shaped fronds 1ft. to 1½ft. long, narrowed to an acute point and very gradually into the stalk below, their margins being slightly toothed. The abundant and conspicuous sori (spore masses) reach from the midrib nearly to the edge. *A. sundense* is another name for this species.—*Hooker, Synopsis Filicum*, p. 192. *Nicholson, Dictionary of Gardening*, i., p. 135.

A. (Darea) viviparum—Da′-rĕ-a; vi-vip′-ar-um (plant-bearing), *Presl.*

This exceedingly elegant, stove species, native of the Mauritius and Bourbon Islands, is greatly admired on account of the exquisitely fine nature of its dark green fronds, 1ft. to 2ft. long, 6in. to 8in. broad, borne on firm, erect, greenish stipites (stalks) 6in. to 9in. long. The many closely-placed leaflets, 4in. to 6in. long, 1½in. to 2in. broad, are cut down to numerous pinnatifid pinnules, the lower segments of which are again forked and hardly thicker than a thread: these being of a somewhat erect nature give the plant a very feathery, light appearance (Fig. 134), which is enhanced by the presence of young plants, with which the upper surface of its fronds is entirely covered, and which, when pegged down to the soil, root very freely. The abundant sori (spore masses) are solitary and disposed on the margins of the segments. This is one of the few Aspleniums which do best in a mixture of peat and sand without any addition of loam.—*Hooker*, *Species Filicum*, iii., p. 215. *Nicholson*, *Dictionary of Gardening*, i., p. 135. *Lowe*, *Ferns British and Exotic*, v., t. 9.

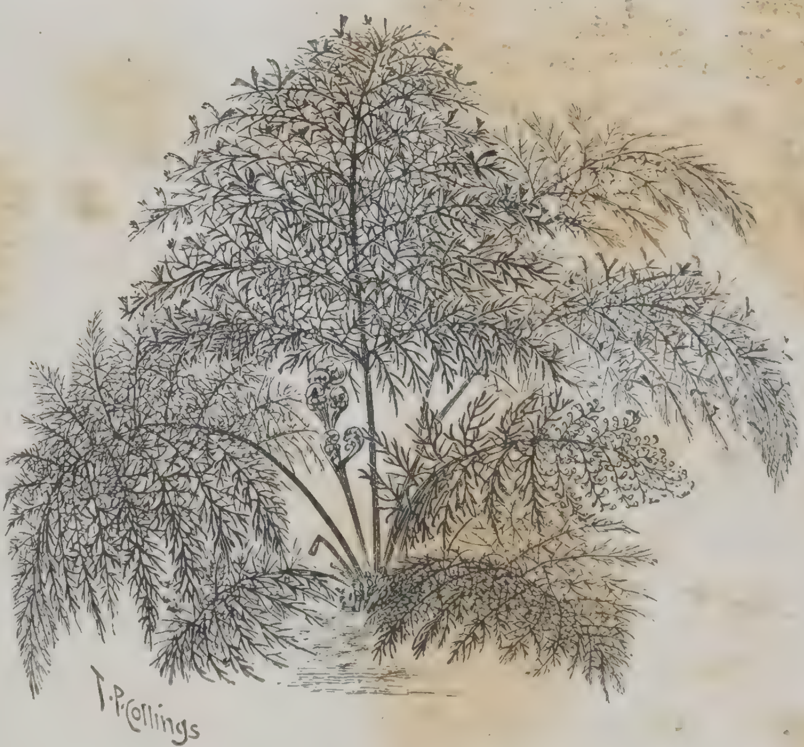


Fig. 134. Asplenium viviparum
(much reduced).

A. v. nobile—no′-bil-ĕ (noble), *Henderson.*

This varietal name, for which we cannot find any authority, is used in gardens for what appears to be a beautiful and more vigorous form of the foregoing species, and it also requires stove treatment. It was accidentally imported from New Guinea by Messrs. E. G. Henderson, who distributed it simply as *A. nobile.* It is a much easier plant to cultivate than *A. viviparum*, and it beautifully-feathery fronds, of a much more open and flat nature, about 1½ft. long, are of a bright, shining green and produced from a thick, fleshy rhizome (prostrate stem). They are quadripinnate (four times divided to the midrib), and are furnished with broad leaflets which are subdivided into narrow pinnules (leafits) and thread-like segments three times as long as those of *A. viviparum* and elegantly pendulous. These fronds are of a pleasing, arching habit; their feathery appearance, as is the case with the typical species, is rendered still more striking by the presence of numerous young plants covering the upper surface of the mature fronds; and as the rudimentary or first fronds of these young plants are very broad and entire (undivided), the contrast is very effective, The abundant sori (spore masses) are linear (long and narrow) and disposed one on the margin of each segment.

A. (**Euasplenium**) **vulcanicum** — Eu-as-ple′-nĭ-um ; vul-ca′-nic-um (volcanic), *Blume.*

A very distinct, stove species, native of the Malay Islands, with fronds 1ft. to 2ft. long, 4in. to 8in. broad, and borne on firm, naked stalks 6in. to 9in. long and of a peculiar grey colour. They are oblong-spear-shaped and composed of a linear terminal leaflet, usually proliferous at its extremity, and of from six to twelve lateral ones on each side of the midrib. These leaflets are of a thin, papery texture and distinctly stalked, 4in. to 6in. long, barely 1in. broad, sharp-pointed, and have their edge slightly notched or toothed. The sori (spore masses), very regular and parallel in their disposition, fall short of the edge. *A. heterodon* is synonymous with this species: it is said to differ by its stouter habit, broader leaflets, and fewer spore masses.—*Hooker, Species Filicum*, iii., p. 102. *Nicholson, Dictionary of Gardening*, i., p. 135.

A. (**Euasplenium**) **Wightianum** — Eu-as-ple′-nĭ-um ; Wight-ĭ-a′-num (Wight's), *Wallich.*

This very distinct, stove species, with barren and fertile fronds totally dissimilar, is a native of India, where, according to Beddome, it is found on the Anamallay and Pulney Mountains and in the Bolamputty Valley, in the Coimbatore Hills, growing on rocks and trees in moist forests on the banks of rivers at elevations varying between 2000ft. and 4000ft. Its fertile fronds, 1ft. to 1½ft. long, are furnished with distinctly-stalked leaflets of a leathery texture, 4in. to 6in. long, coarsely but not deeply toothed. In the case of the barren fronds, the leaflets are much larger, deeply and irregularly pinnatifid (cut half-way to the midrib), with the segments toothed. The sori (spore masses) are linear (long and narrow), distant, and extend from the midrib nearly to the margin of the segments.—*Hooker, Species Filicum*, iii., p. 105. *Beddome, Ferns of Southern India*, t. 126.

A. (Athyrium) woodwardioides—Ath-yr′-ĭ-um ; wood-ward-ĭ-ŏ-i′-dēs (Woodwardia-like), *Baker.*

A stove species, native of Java and the Philippine Islands, and somewhat like *A. polypodioides* in general habit. Its handsome, ample fronds, 2ft. to 3ft. long and 1ft. or more broad, are borne on firm, erect stalks of a peculiar dark-chestnut colour ; their leaflets, 6in. to 9in. long and 3in. broad, are cut into spear-shaped, slightly-stalked pinnules (leafits) 1½in. long that are again divided into somewhat sickle-shaped lobes of a soft, papery texture. The oblong sori (spore masses) are confined to the lower lobes close to the midrib and do not reach more than half-way to the edge.—*Hooker*, *Synopsis Filicum,* p. 229.

A. (Euasplenium) zamioides—Eu-as-ple′-nĭ-um ; za-mĭ-ŏ-i′-dēs (like a Zamia), *Hooker.*

A thoroughly distinct and somewhat coarse-growing, stove species, native of Java, Sumatra, and Penang, with fronds 1ft. to 2ft. long and 6in. to 9in. broad, borne on stout, fleshy stalks of a somewhat scaly nature. These fronds are composed of a terminal broadly-oblong leaflet and of ten or twelve lateral ones of leathery texture on each side of the midrib, the lowest of which are 5in. to 6in. long, 1½in. broad, with a sharp point and slightly toothed, the lower part wedge-shaped at the base, and the two sides unequal, the upper one narrowed suddenly almost to a right angle, and the lower one obliquely cuneate. The sori (spore masses), elongated and sometimes 1in. long, are almost parallel with the midvein and reach nearly to the margin.—*Hooker*, *Species Filicum,* iii., p. 114, t. 170. *Beddome*, *Ferns of British India,* t. 193.

A. (Diplazium) zeylanicum—Dip-laz′-ĭ-um ; zey-lan′-ic-um (Cingalese), *Hooker.*

A very distinct, stove species, native of Ceylon, with fronds 6in. to 12in. long and 1in. to 2in. broad, which are slightly lobed at the summit, the lower two-thirds or middle being deeply pinnatifid, and quite pinnate (divided to the midrib) at the base, where the divisions thus formed are blunt, about ¼in. to ½in. across, and horizontal. These fronds, of a thin, papery texture and pale green colour, are borne on firm, upright stalks 4in. to 8in. long, of a somewhat succulent or fleshy nature and scaly throughout. In young subjects they have an almost erect yet elegant habit, as shown in Fig. 135; but when the plant gets older its outward fronds, of a more flaccid nature, hang all around the pot in a very graceful manner. The sori (spore masses) are very narrow and about ¼in. long, and are disposed on a lateral vein half-way between the costa (midvein) and the margin of the lobe.—*Hooker*, *Species Filicum*, p. 237. *Nicholson, Dictionary of Gardening*, i., p. 135. *Beddome*, *Ferns of Southern India*, t. 228.

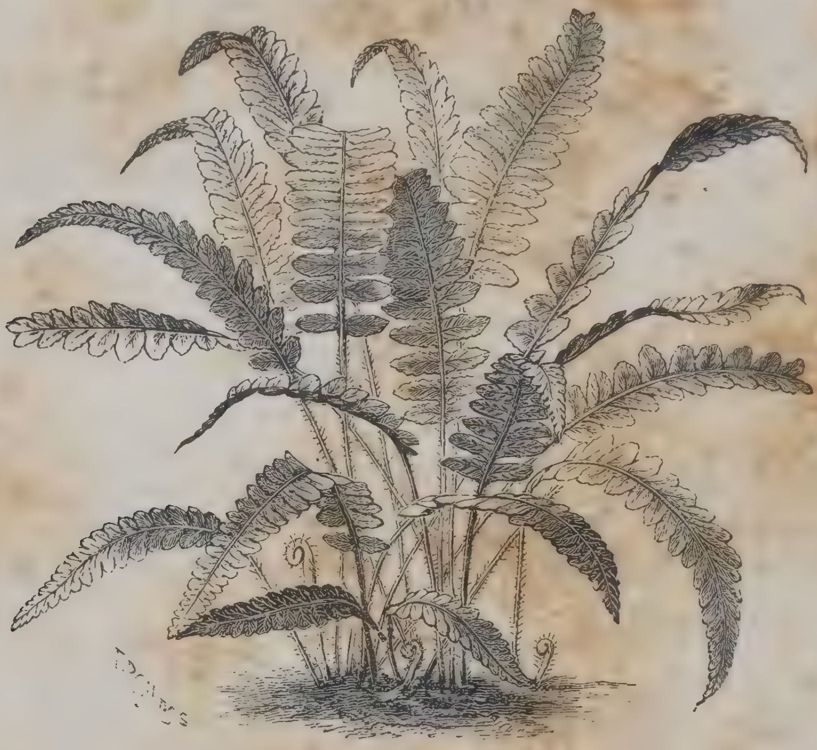


Fig. 135. Asplenium zeylanicum
(much reduced).

* * *

ATHYRIUM—Ath-yr′-ĭ-um. *See* **Asplenium.**

END OF VOLUME I.

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ಲಾಲ್‌ಬಾಗ್, ಬೆಂಗಳೂರು

ಡಾ॥ ಎಂ.ಹೆಚ್.ಮರೀಗೌಡ ರಾಷ್ಟ್ರೀಯ ಗ್ರಂಥಾಲಯ
ಲಾಲ್‌ಬಾಗ್, ಬೆಂಗಳೂರು – 560 004

ವ.ಸಂಖ್ಯೆ:..........................

ಪ.

ಗ್ರಂಥ ಹಿಂದಿರುಗಿಸುವ ದಿನಾಂಕ ಚೀಟಿ

ಈ ಕೆಳಗೆ ಕಾಣಿಸಿರುವ ದಿನದಂದು ಅಥವಾ ಅದಕ್ಕೂ ಮುಂಚೆ ಈ ಪುಸ್ತಕವನ್ನು ಹಿಂದಿರುಗಿಸಬೇಕು. ಅಥವಾ ಮುಂಚಿತವಾಗಿ ನವೀಕರಿಸಬೇಕು. ಇಲ್ಲದಿದ್ದರೆ ಒಂದು ದಿನಕ್ಕೆ ರೂ.1.00 ದಂಡ ಕೊಡಬೇಕಾಗುತ್ತದೆ.

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ವ. ಸಂಖ್ಯೆ ------------------------

ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯ
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